

# Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report									
RSY Pad: RSY 29 Use 1					Soil Origin: Former Building Sites 317, 364, and 365 SU28A				
Data attached and submitted by: Amy Mangel					Data Report Submittal Date: 01/05/2021				

Systematic Soil Sample Data: RSY 29 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	<sup>235</sup> U Final Analytical Results (pCi/g)	<sup>239</sup> Pu Final Analytical Results (pCi/g)
Project Remediation Goals*									
HPPG-317364365-SU28A-001	1	Systematic	11,440	15,658	0.336	-0.000467	0.0443	0.0270	0.000
HPPG-317364365-SU28A-002	2	Systematic	10,207	15,658	0.439	-0.0459	N/A	N/A	N/A
HPPG-317364365-SU28A-003	3	Systematic	11,124	15,658	0.179	0.0244	N/A	N/A	N/A
HPPG-317364365-SU28A-004	4	Systematic	11,376	15,658	0.380	0.00474	N/A	N/A	N/A
HPPG-317364365-SU28A-005	5	Systematic	10,130	15,658	0.357	-0.0284	N/A	N/A	N/A
HPPG-317364365-SU28A-006	6	Systematic	10,163	15,658	0.373	0.0306	N/A	N/A	N/A
HPPG-317364365-SU28A-007	7	Systematic	11,478	15,658	0.666	0.0361	N/A	N/A	N/A
HPPG-317364365-SU28A-008	8	Systematic	10,578	15,658	0.0994	0.0189	N/A	N/A	N/A
HPPG-317364365-SU28A-009	9	Systematic	10,651	15,658	0.202	-0.0958	N/A	N/A	N/A
HPPG-317364365-SU28A-010	10	Systematic	10,169	15,658	0.292	-0.00897	N/A	N/A	N/A
HPPG-317364365-SU28A-011	11	Systematic	10,574	15,658	0.276	0.000	-0.0184	0.0110	0.000
HPPG-317364365-SU28A-012	12	Systematic	10,753	15,658	0.235	0.00289	N/A	N/A	N/A
HPPG-317364365-SU28A-013	13	Systematic	8,774	15,658	0.274	0.0207	N/A	N/A	N/A
HPPG-317364365-SU28A-014	14	Systematic	9,237	15,658	0.390	-0.0442	N/A	N/A	N/A
HPPG-317364365-SU28A-015	15	Systematic	9,912	15,658	0.0648	0.0219	N/A	N/A	N/A
HPPG-317364365-SU28A-016	16	Systematic	10,950	15,658	0.132	-0.0909	N/A	N/A	N/A
HPPG-317364365-SU28A-017	17	Systematic	11,310	15,658	0.429	0.00115	N/A	N/A	N/A
HPPG-317364365-SU28A-018	18	Systematic	9,976	15,658	0.412	-0.0318	N/A	N/A	N/A
HPPG-317364365-SU28A-019	19	Systematic	10,018	15,658	0.306	0.0244	N/A	N/A	N/A
HPPG-317364365-SU28A-020	20	Systematic	9,635	15,658	0.302	-0.0548	N/A	N/A	N/A
HPPG-317364365-SU28A-021	21	Systematic	10,591	15,658	0.342	0.0273	0.00871	0.0109	0.00209
HPPG-317364365-SU28A-022	22	Systematic	10,950	15,658	0.382	0.0247	N/A	N/A	N/A
HPPG-317364365-SU28A-023	23	Systematic	9,025	15,658	0.221	0.00513	N/A	N/A	N/A
HPPG-317364365-SU28A-024	24	Systematic	9,970	15,658	0.317	0.0168	N/A	N/A	N/A
HPPG-317364365-SU28A-025	25	Systematic	10,572	15,658	0.400	0.0000949	N/A	N/A	N/A
Soil Systematic Sample Statistics					<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	<sup>235</sup> U Final Analytical Results (pCi/g)	<sup>239</sup> Pu Final Analytical Results (pCi/g)
Maximum					0.666	0.0361	0.0443	0.0270	0.00209
Mean					0.3122	-0.0057	0.0115	0.0163	0.000697
Median					0.317	0.0029	0.0087	0.0110	0.000
Minimum					0.0648	-0.0958	-0.0184	0.0109	0.000
Standard Deviation					0.1261	0.0365	N/A	N/A	N/A

Biased Soil Sample Data: RSY 29 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)	<sup>235</sup> U Final Analytical Results (pCi/g)	<sup>239</sup> Pu Final Analytical Results (pCi/g)
Project Remediation Goals*									
HPPG-317364365-SU28A-B-001	1	Biased	11,109	15,658	0.553	-0.0337	0.0477	0.0314	0.00576

CPM Counts per minute

pCi/g Picocuries per gram

\* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-10202020-PG-ROV-203	10/20/2020	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-10212020-PG-JSS-210	10/21/2020	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-10212020-PG-JSS-209	10/21/2020	3x3	08/06/2021	108853
Biased Sample Survey	HPRS-10222020-PG-JSS-215	10/22/2020	3x3	08/06/2021	108853

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 29 Use 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 44 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 44 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-57. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 58-97). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 58-97). Samples HPPG-F-015 and HPPG-F-016 are field duplicates, correlating to systematic samples -008 and -018. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project. The Instrument and Survey Summary table above lists the 3x3 NaI detector used for the gamma static measurements collected during sampling activities, and the instrument-specific gamma static IL listed in the sample tables on page one is developed from that instrument's RBA data.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1 and 3.4.1, one biased sample was collected since all follow-up static measurements were below the ROC-specific critical levels. The biased sample was collected from the location of the highest gross gamma scan measurement. TestAmerica sample results are attached (pages 98-114). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
<b>Conclusions:</b>  In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background.  RSY 29 Use 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation Former Building Sites 317, 364, 365 SU 28A.  APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for Former Building Sites 317, 364, 365 SU 28A.

## Soil Scan Statistics

Statistical Summary

Dataset		PG-RSY-29-U1				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	29.06	12.03	12.02	3.71
ROI-06		47.10	125.25	85.89	85.20	12.07
ROI-07		31.06	104.22	66.89	67.12	9.99
ROI-08		63.14	156.39	107.92	108.22	14.09
ROI-10		1,783.69	2,650.48	2,241.87	2,269.81	174.95

Statistical Summary Reference Background

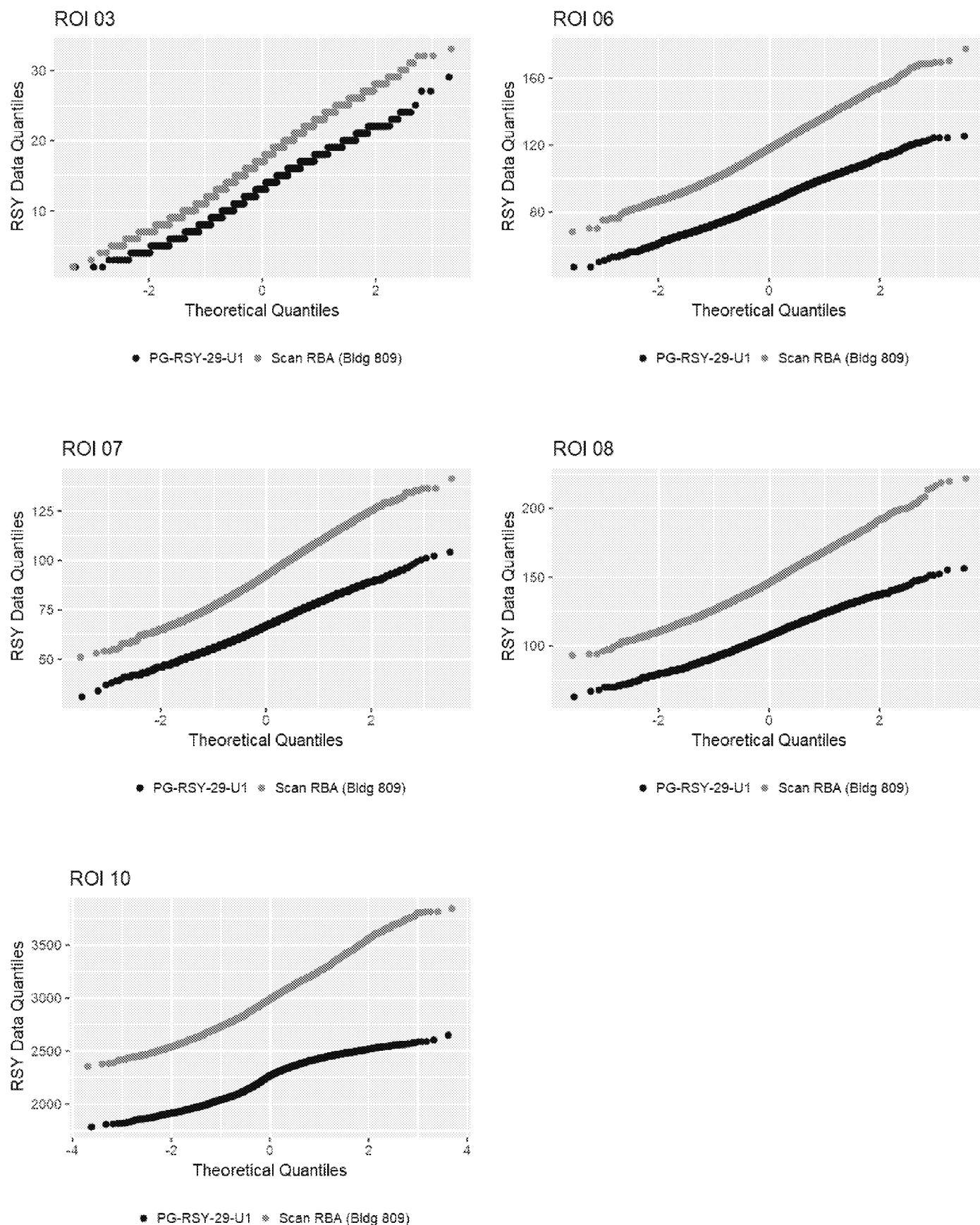
TYPE		Scan RBA (Bldg 809)				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-29-U1	3474
Scan RBA (Bldg 809)	4632

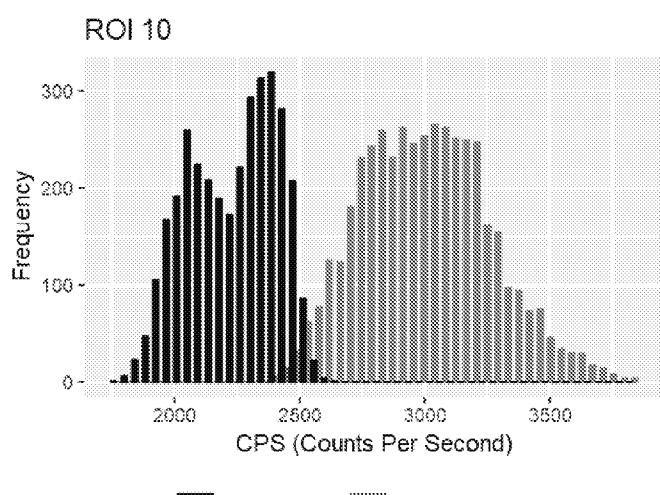
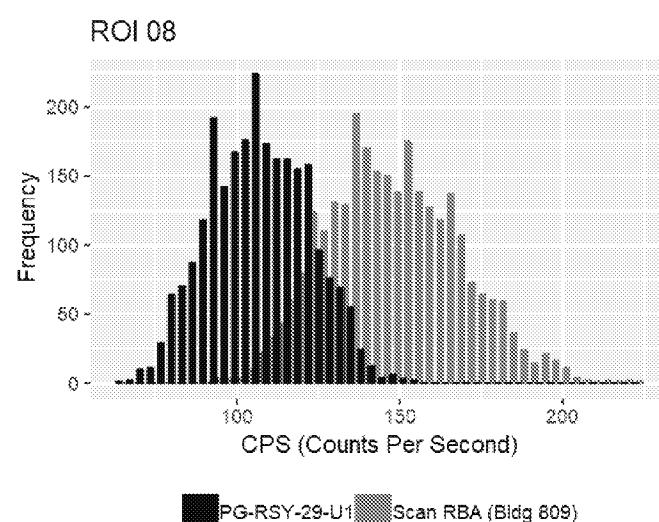
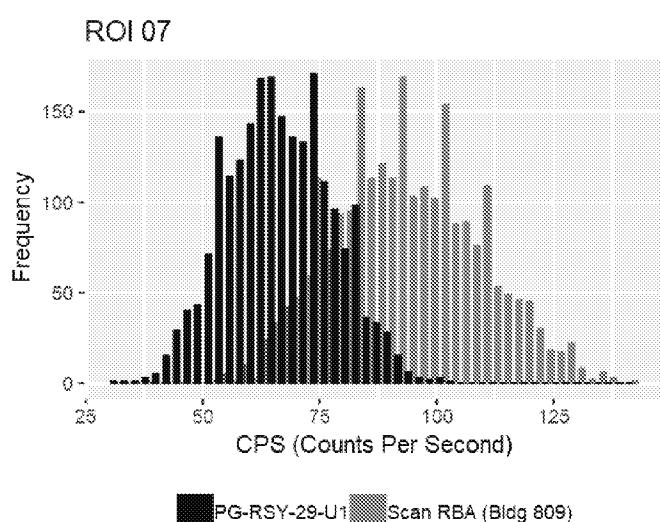
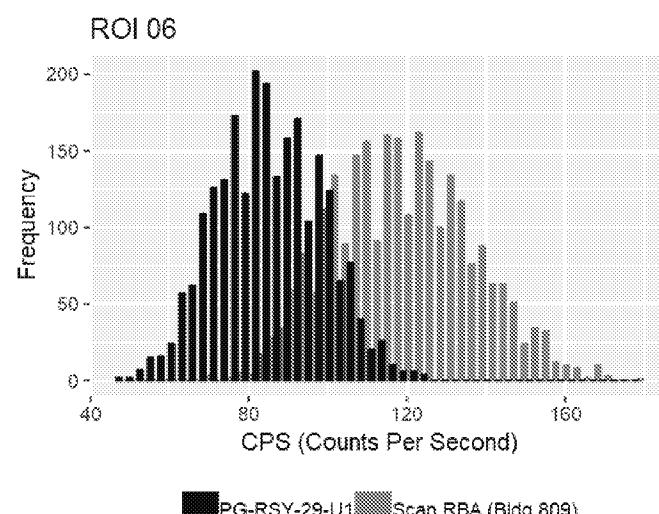
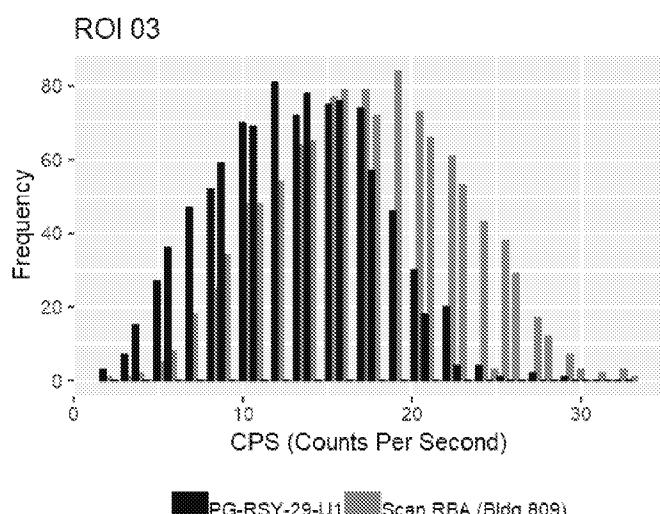
# Soil Scan Statistics

## Normal Q-Q Plots



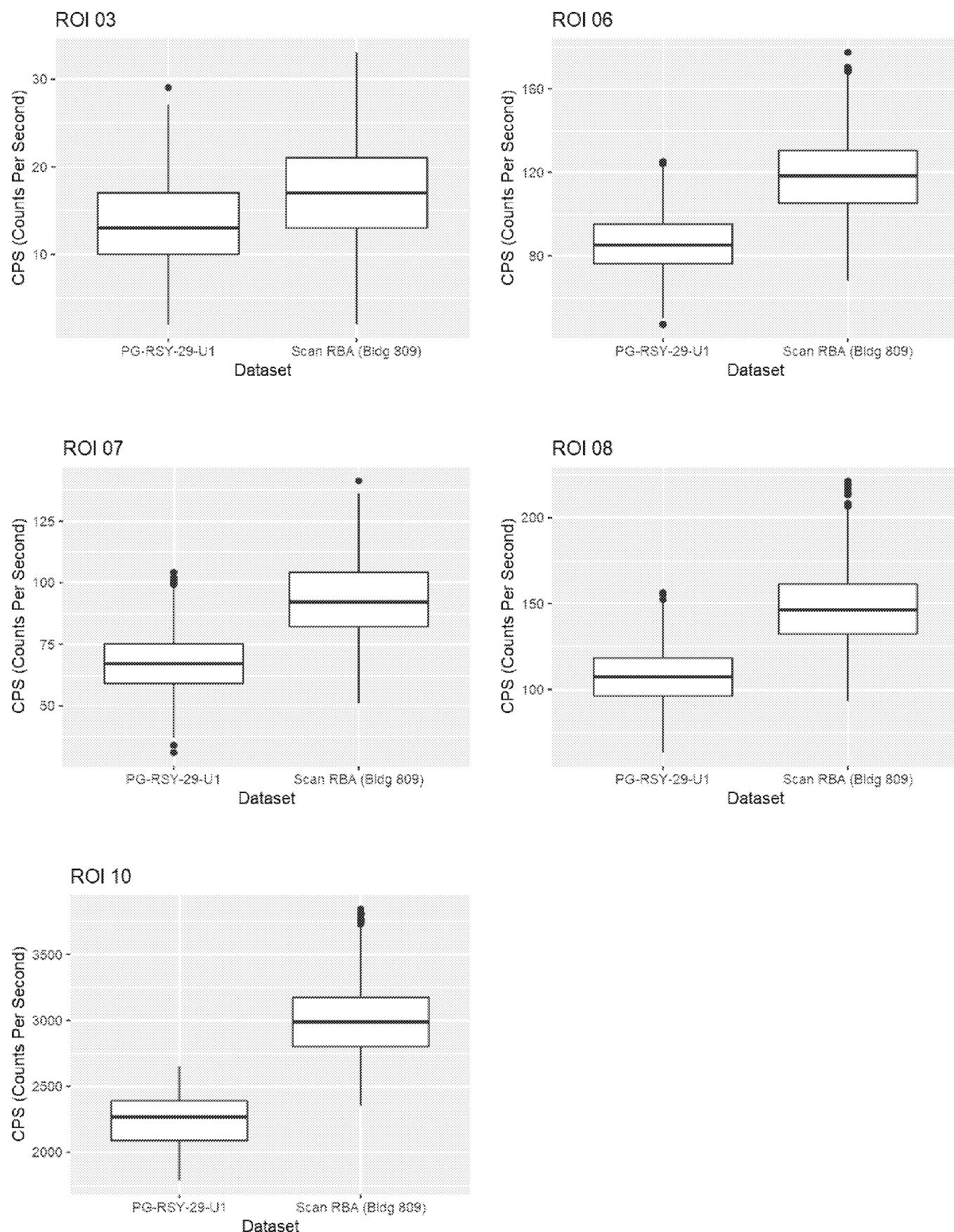
# Soil Scan Statistics

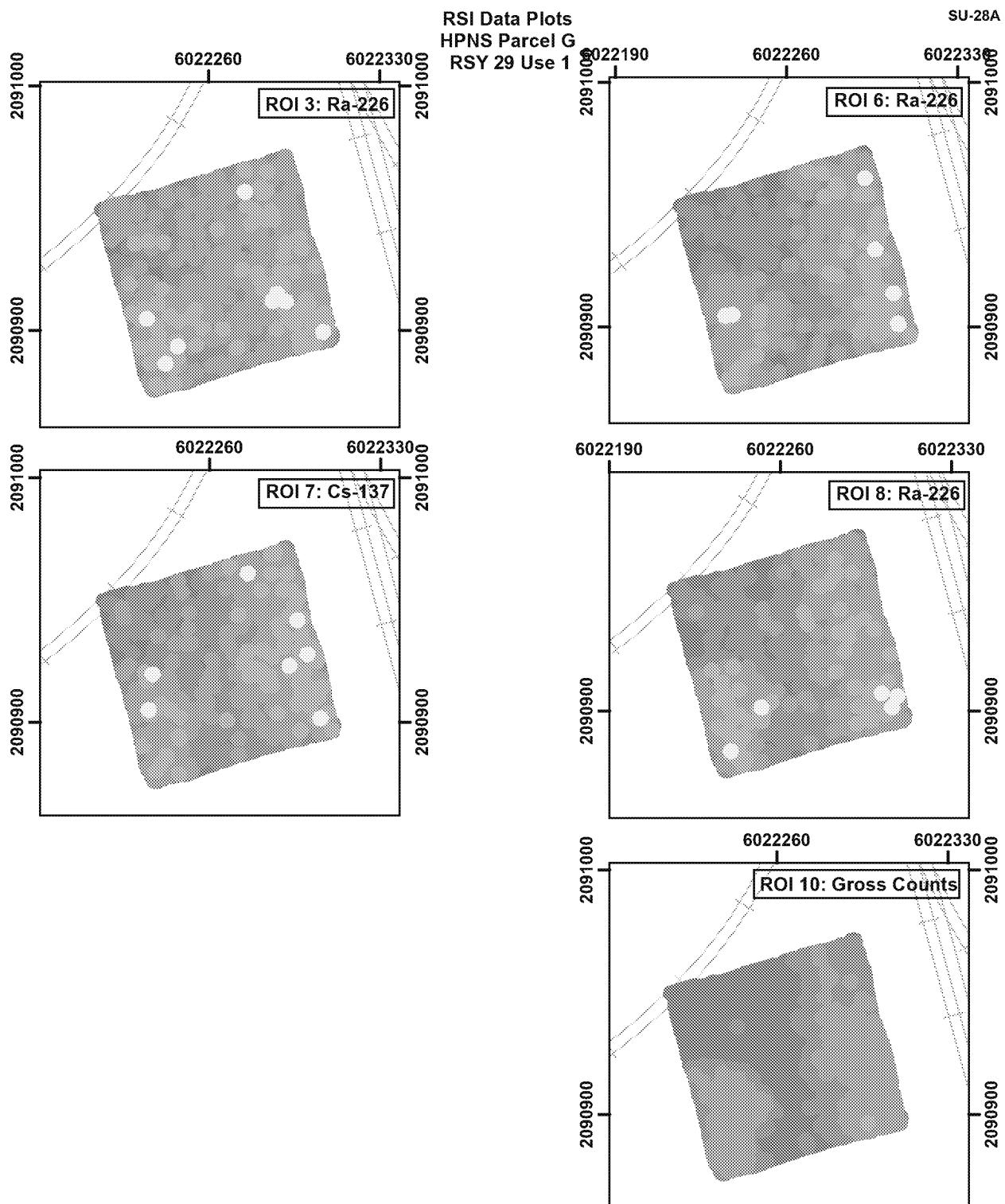
## Histograms



# Soil Scan Statistics

## Box Plots





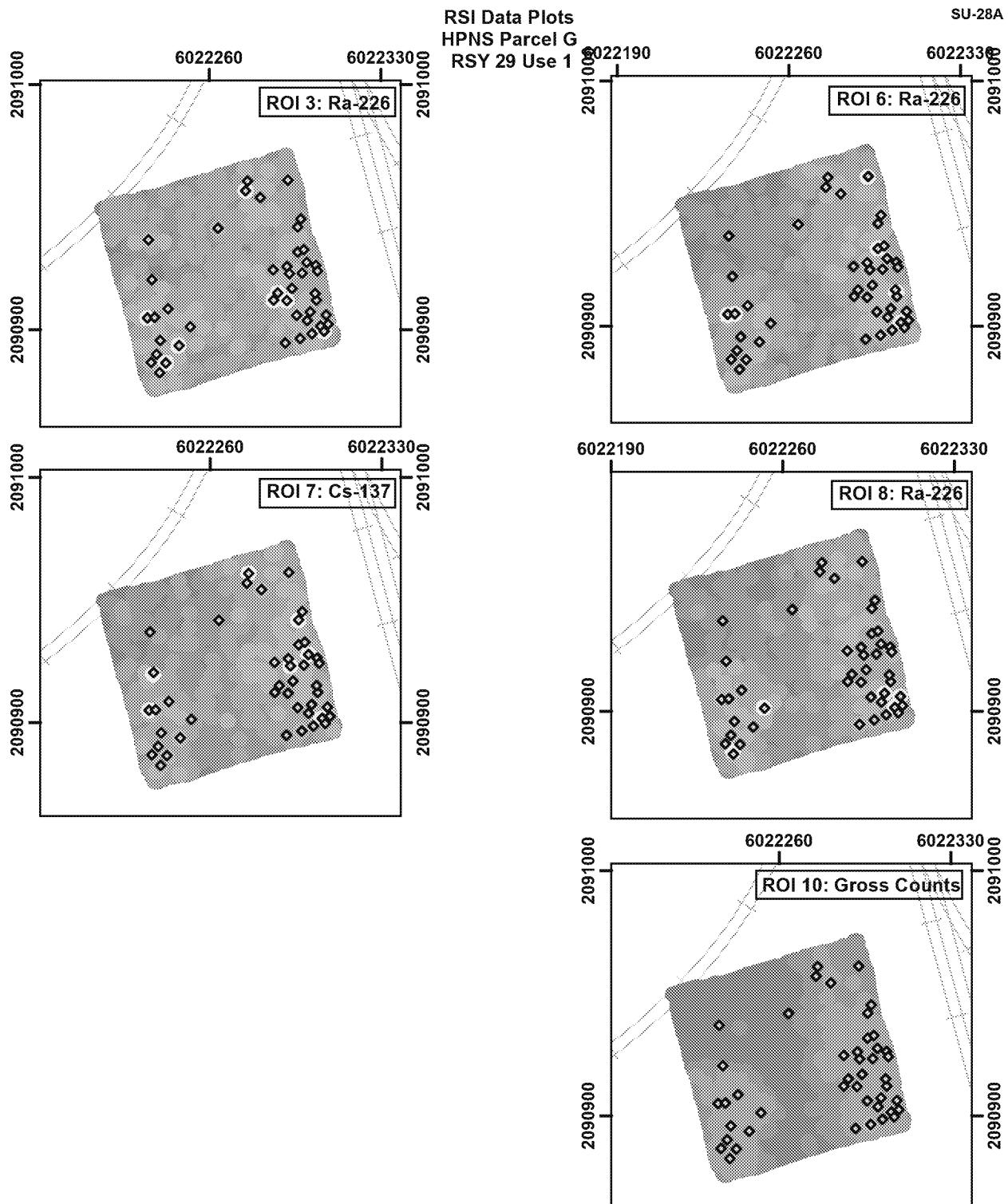
**RS 700 Gamma Walkover Survey Data (VD1)**

> 3 std dev	> -1 to < 0 std dev
●	●
> 2 to < 3 std dev	> -2 to < -1 std dev
●	●
> 1 to < 2 std dev	> -3 to < -2 std dev
●	●
> 0 to < 1 std dev	< -3 std dev
●	●

0 25 50 100  
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**RS 700 Gamma Walkover Survey Data (VD1)**

- |                      |                        |
|----------------------|------------------------|
| ◆ Follow-Up Location | ● > -1 to < 0 std dev  |
| > 3 std dev          | ● > -2 to < -1 std dev |
| ● > 2 to < 3 std dev | ● > -3 to < -2 std dev |
| ● > 1 to < 2 std dev | ● < -3 std dev         |
| ● > 0 to < 1 std dev |                        |

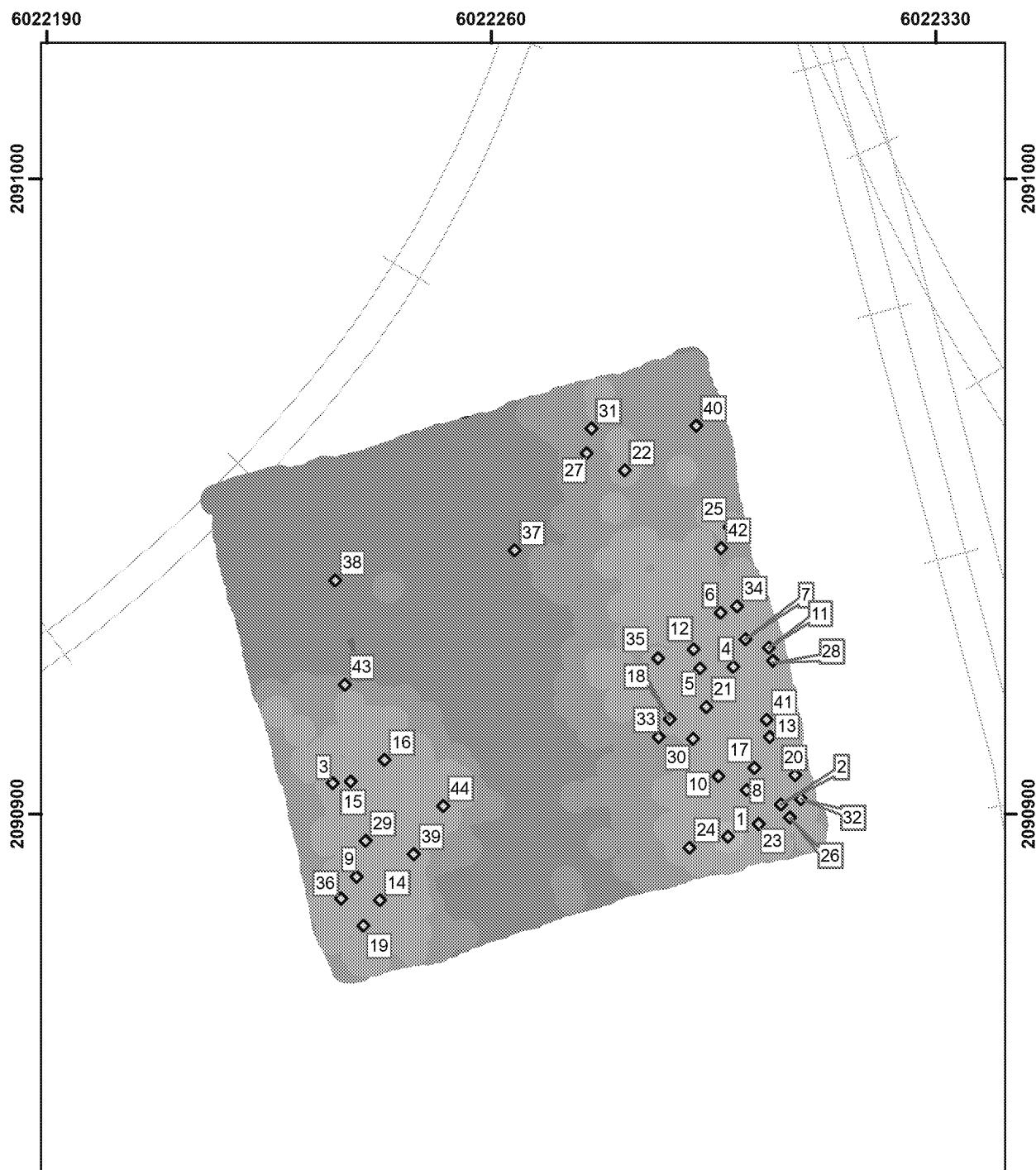
0 25 50 100  
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



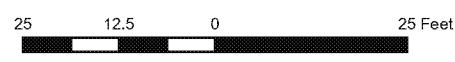
**Follow-Up Static Survey  
HPNS Parcel G  
RSY 29 Use 1**

SU-28A



**RSY 29 Use 1 (VD1, ROI 10 Gross Gamma)**

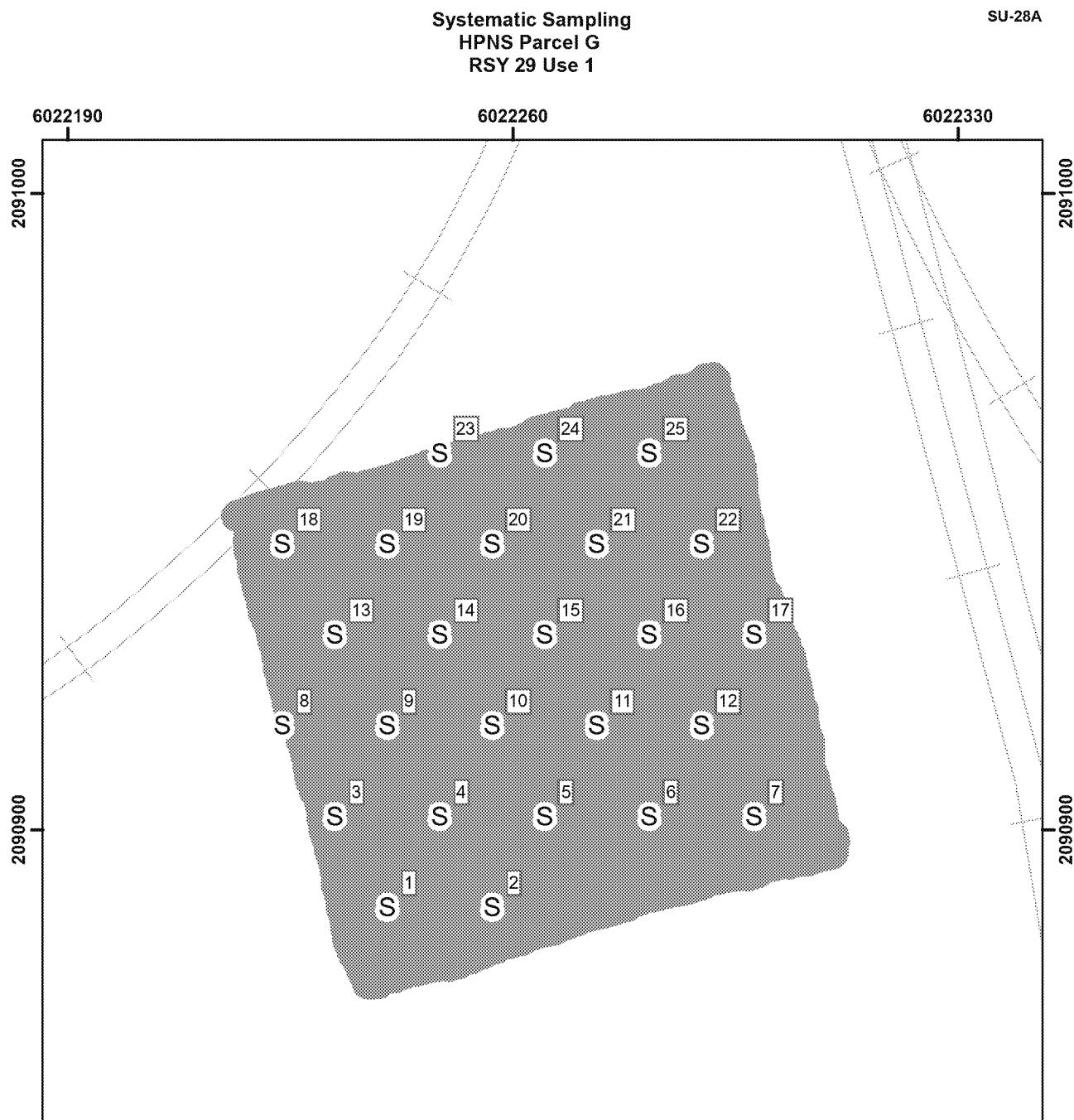
- ◆ Follow-Up Location
- > 3 std dev
- > 2 to < 3 std dev
- > 0 to < 1 std dev
- > -1 to < 0 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev

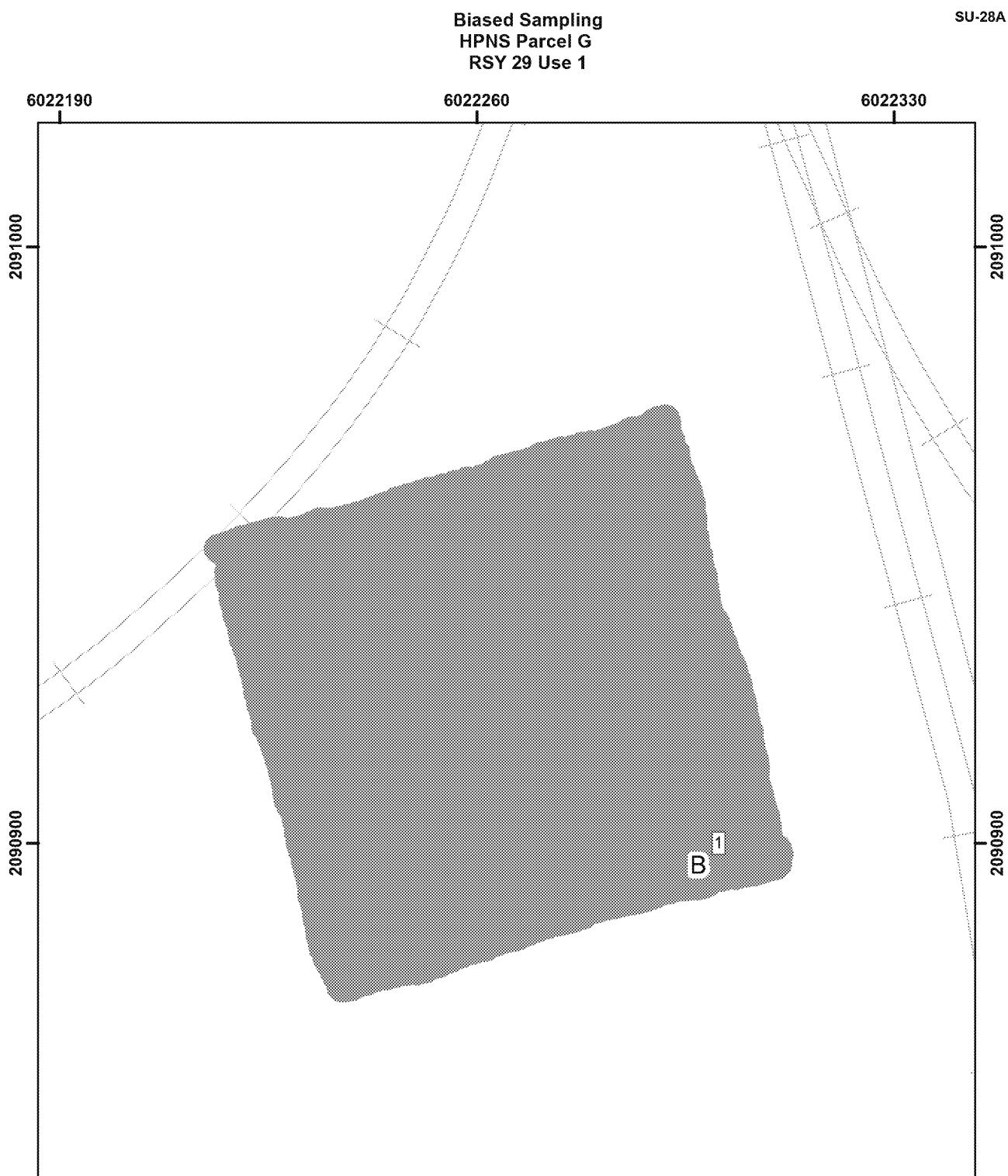


Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM



**RSY 29 Use 1**

B Biased Sample Location

● RS-700 GWS Coverage

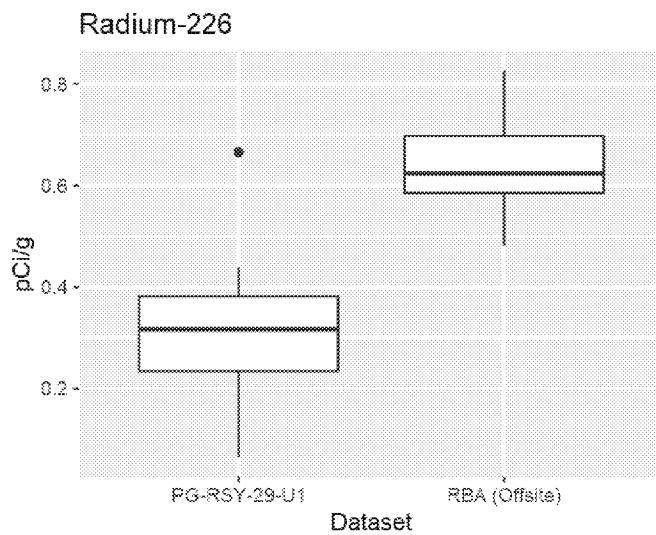
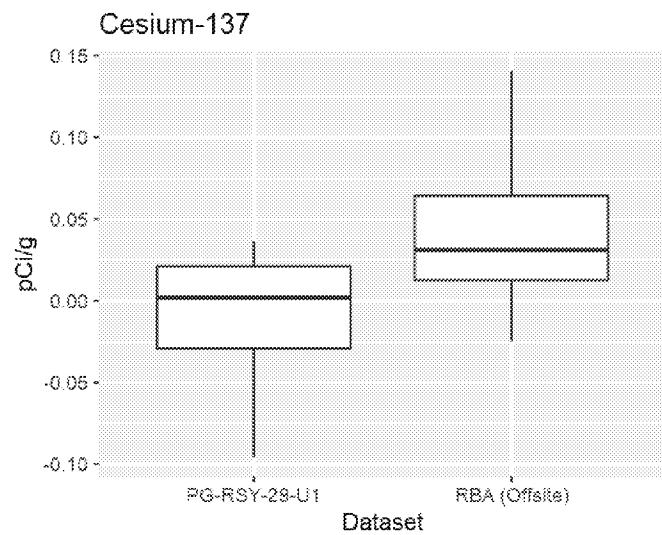
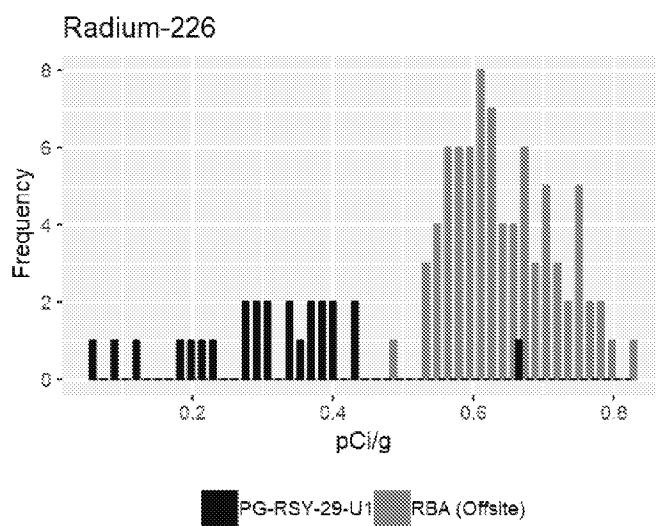
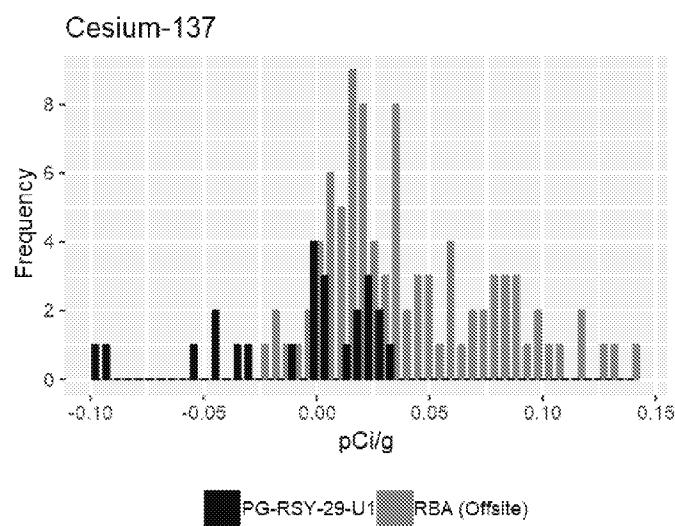
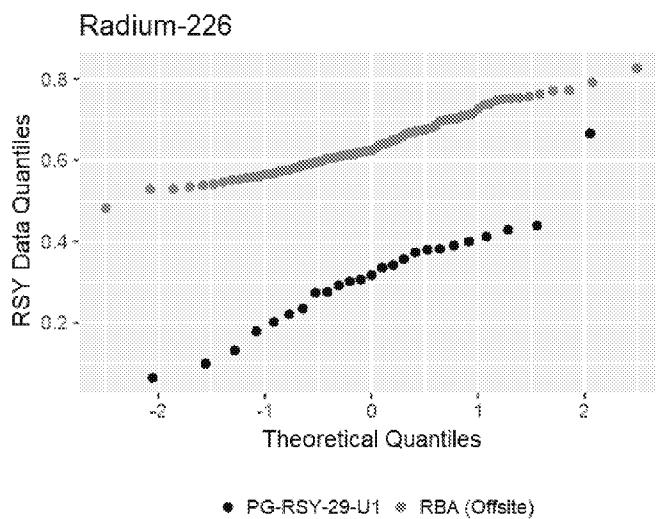
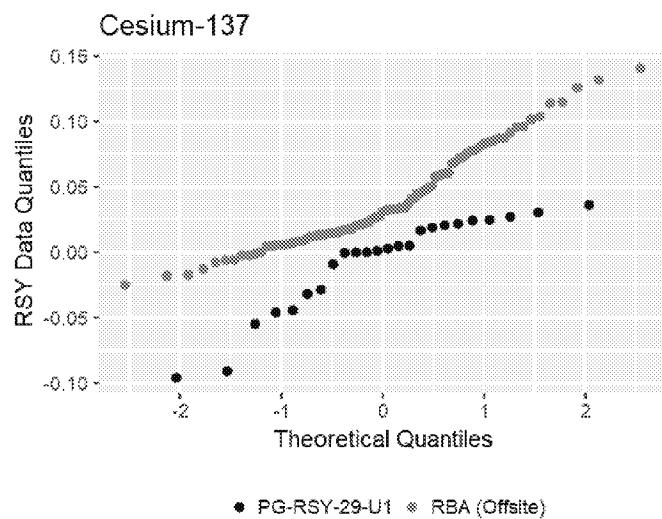
25      12.5      0      25 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

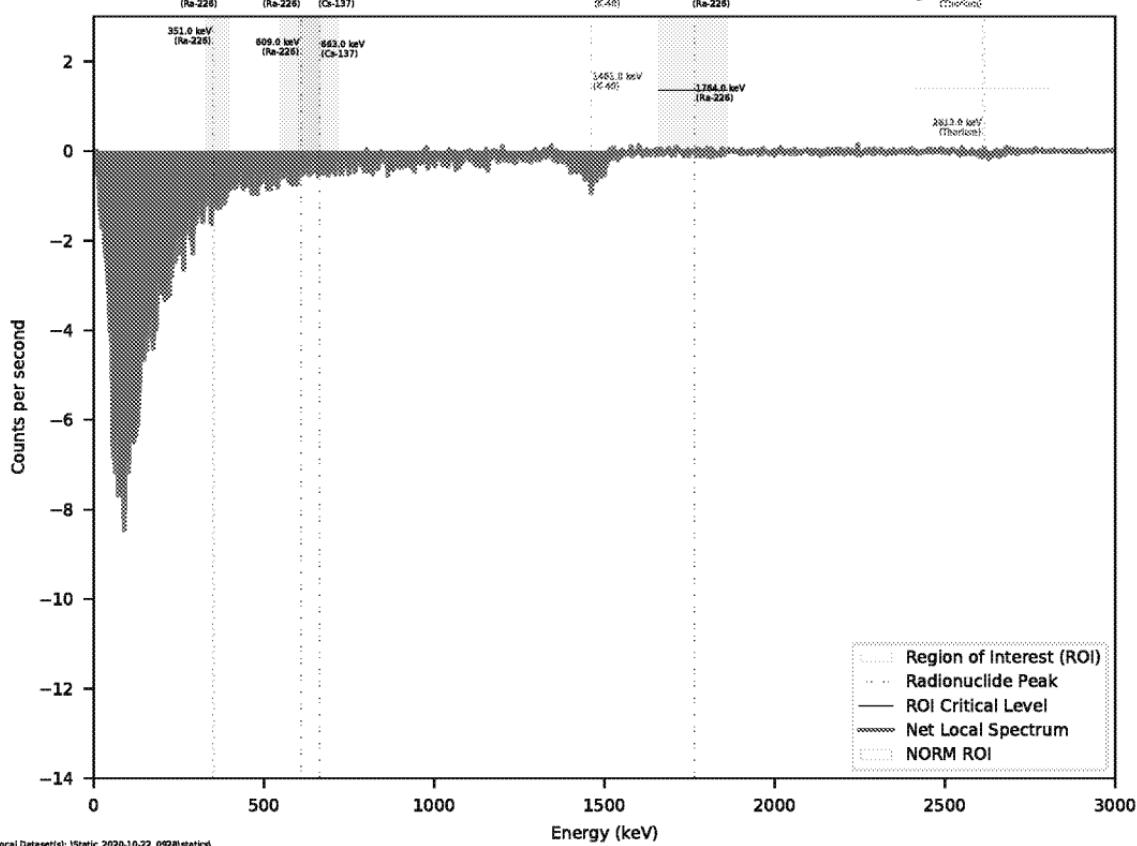
## Soil Sample Statistics





# Net Gamma Spectrum, Static Location: 1

Page 14 of 114



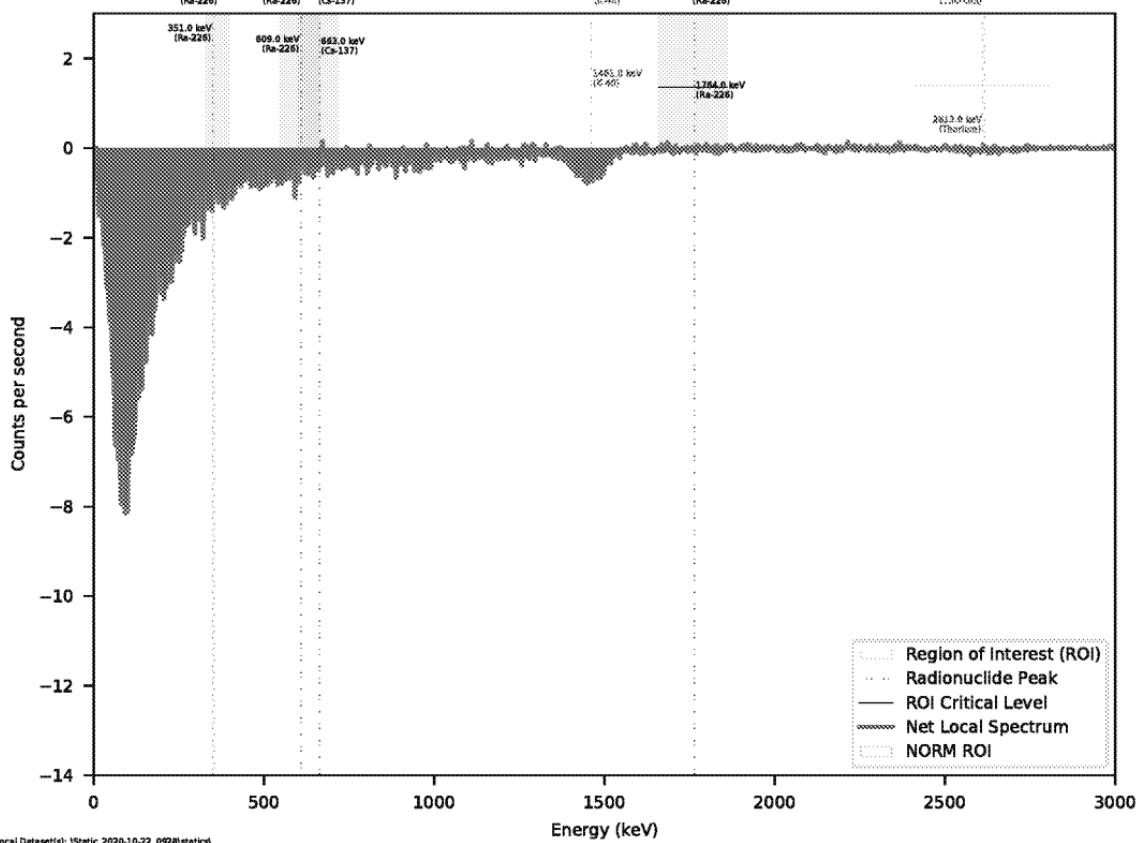
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3649580675691, 37.722451166216224

ED\_006360A\_00000350-00014

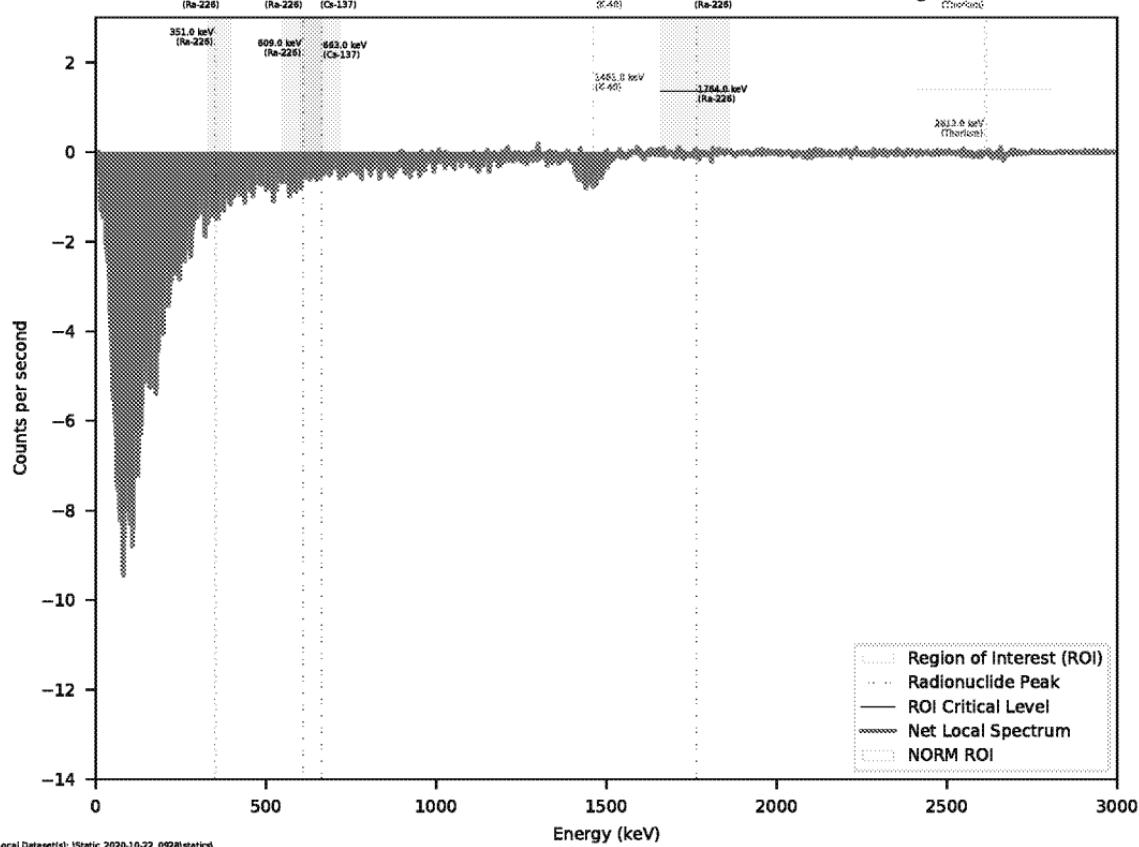
# Net Gamma Spectrum, Static Location: 2

Page 15 of 114  
Circular



# Net Gamma Spectrum, Static Location: 3

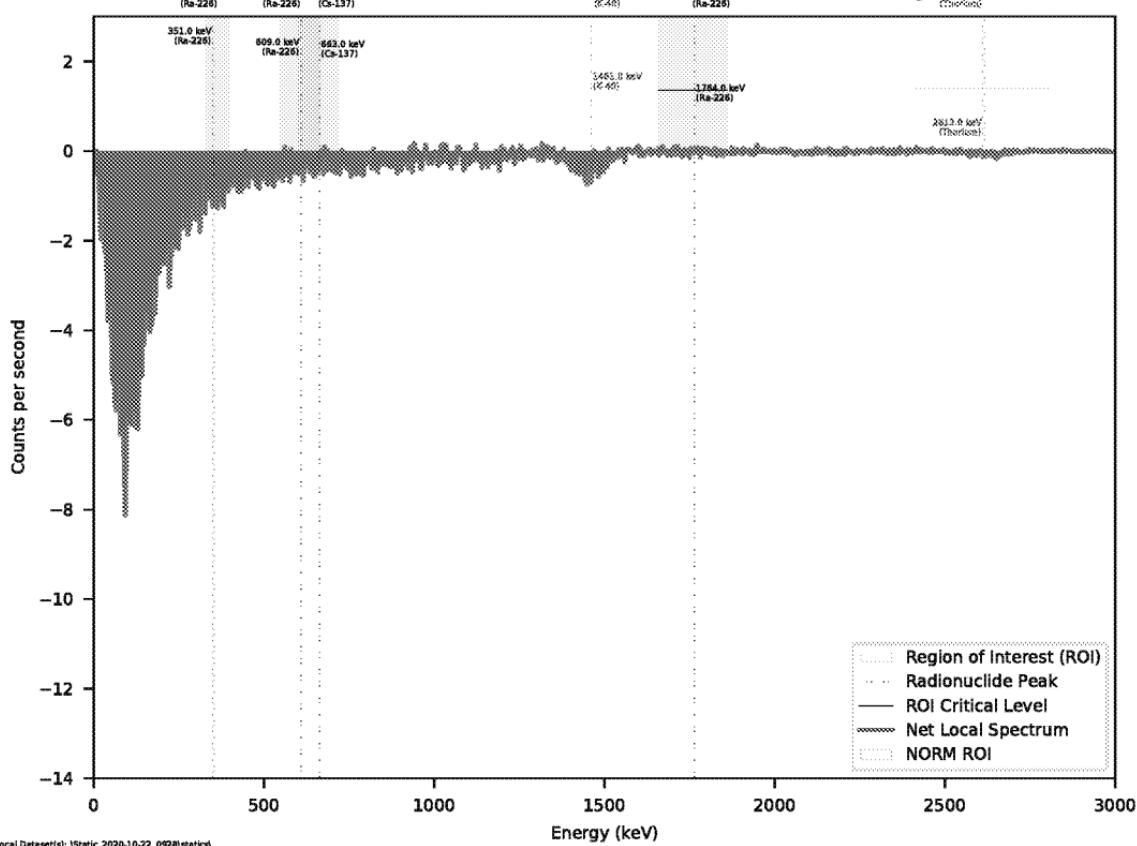
Page 16 of 114



ED\_006360A\_00000350-00016

## Net Gamma Spectrum, Static Location: 4

Page 17 of 114



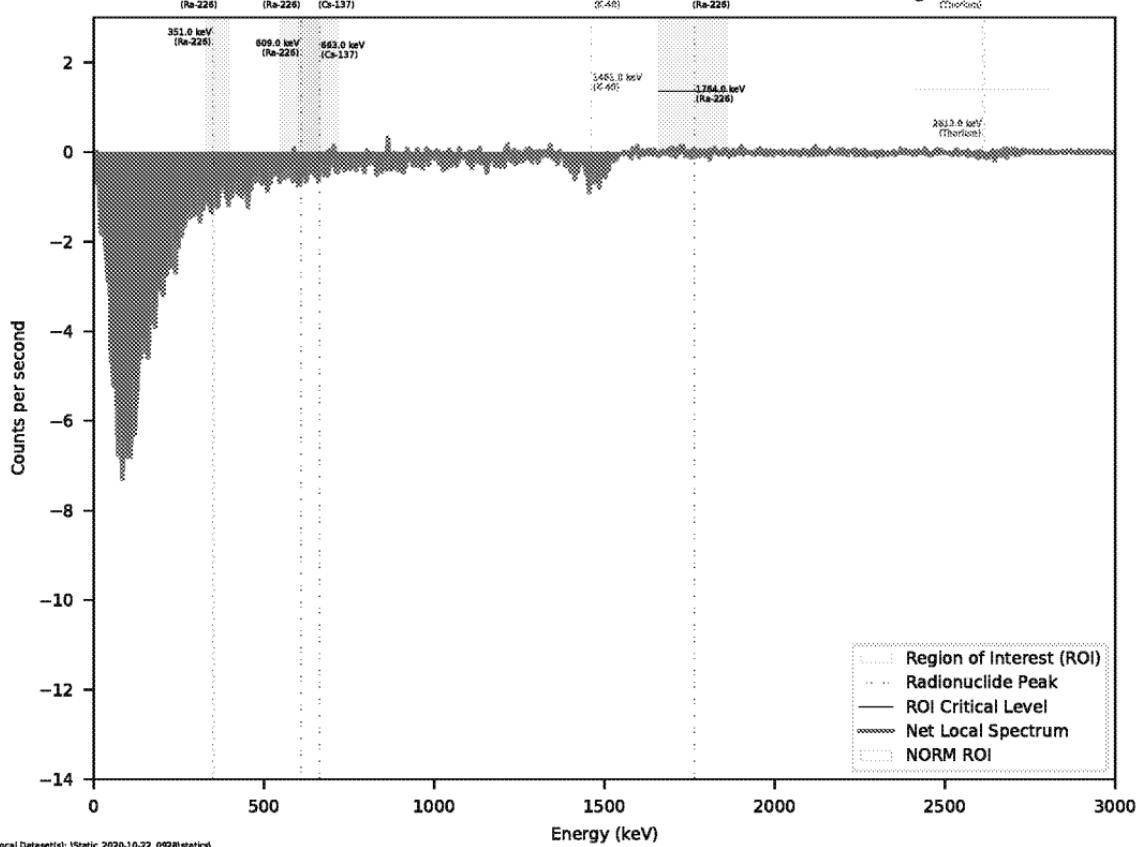
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36500035621, 37.72252274029851

ED\_006360A\_00000350-00017

## Net Gamma Spectrum, Static Location: 5

Page 18 of 114



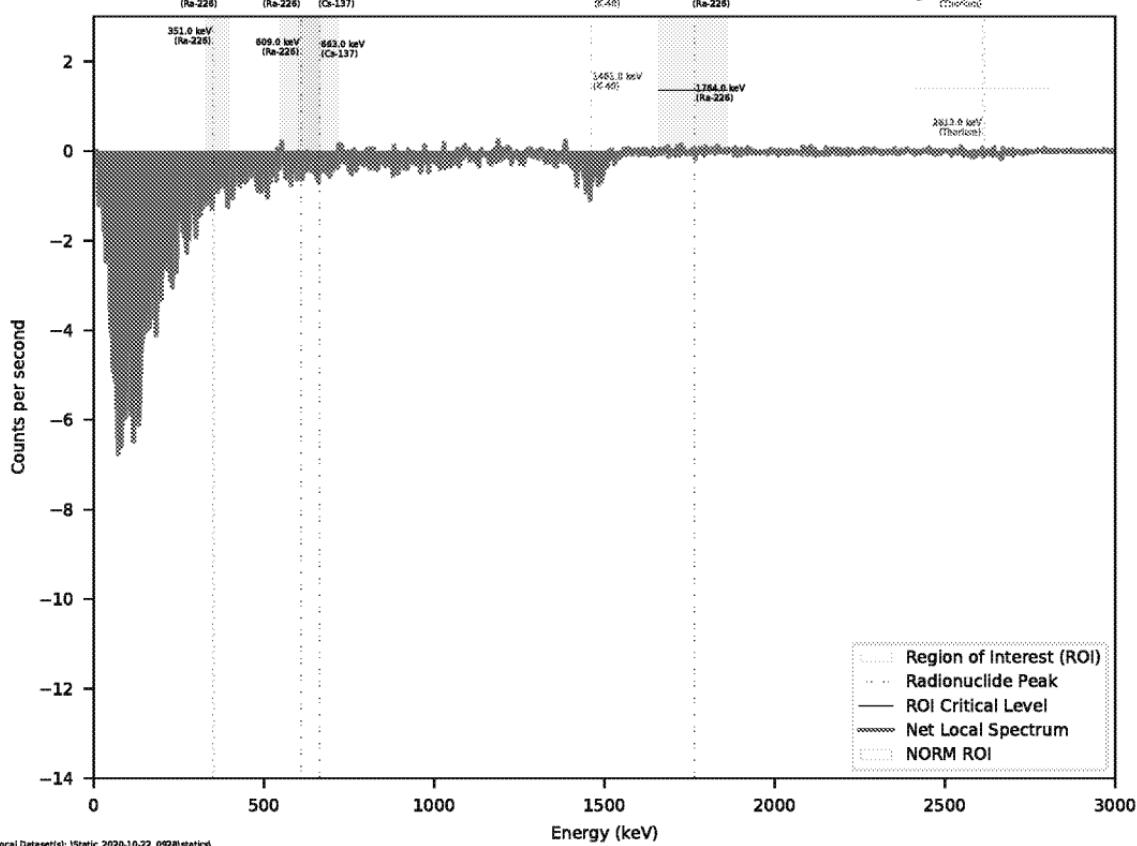
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36501751176459, 37.7225181029412

ED\_006360A\_00000350-00018

# Net Gamma Spectrum, Static Location: 6

Page 19 of 114



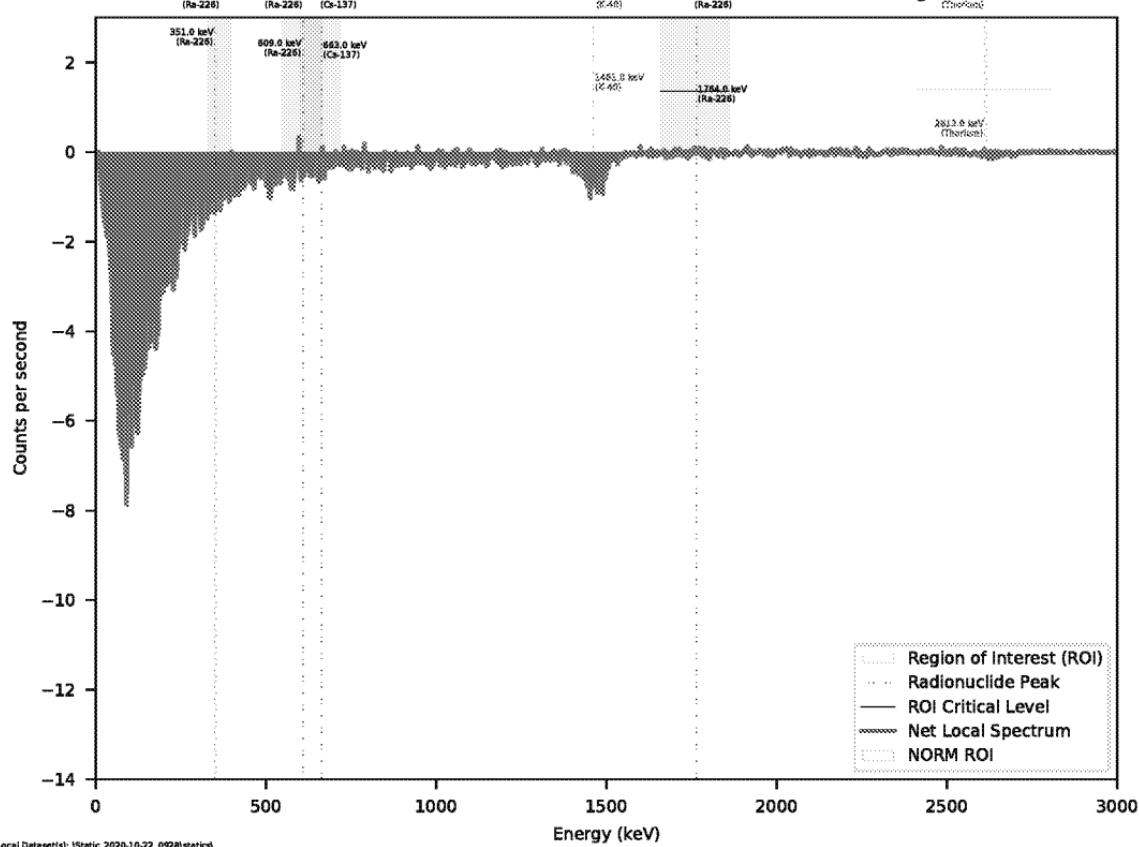
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36500520746283, 37.722541520895525

ED\_006360A\_00000350-00019

# Net Gamma Spectrum, Static Location: 7

Page 20 of 114



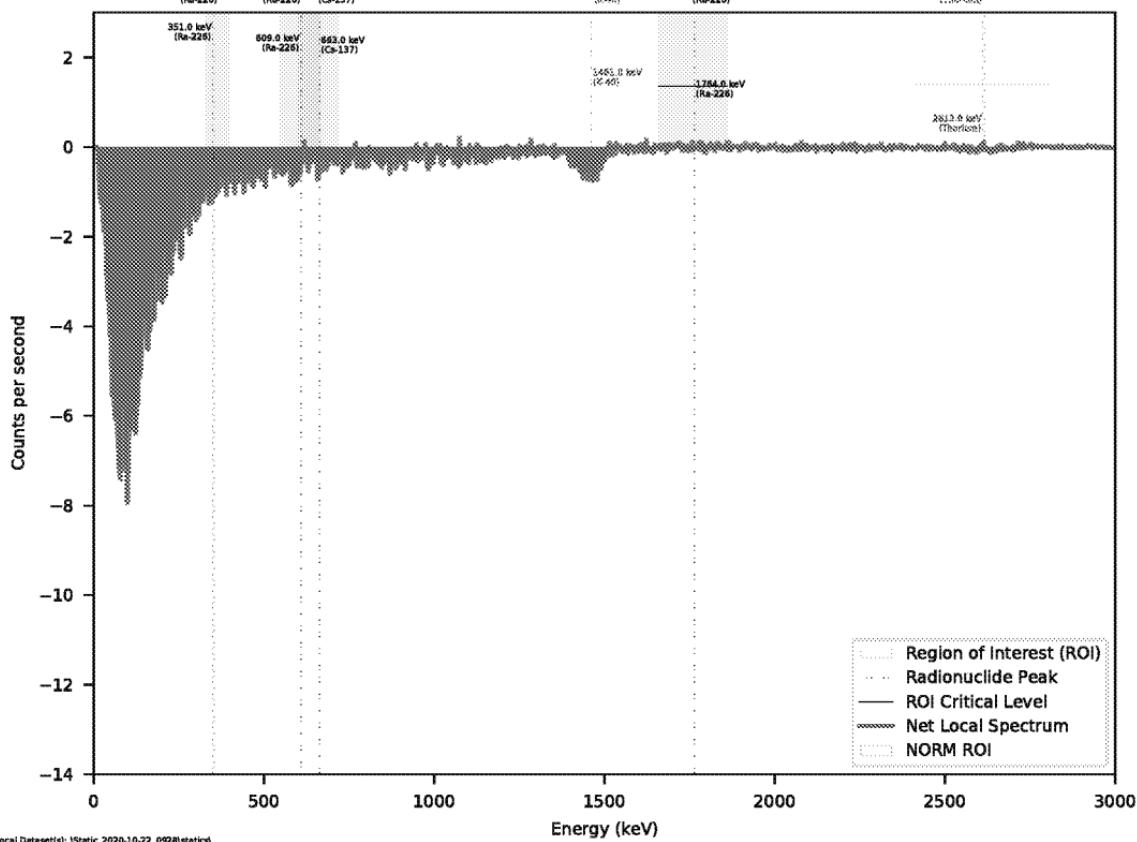
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilNBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3849930955883, 37.72253421176468

ED\_006360A\_00000350-00020

# Net Gamma Spectrum, Static Location: 8

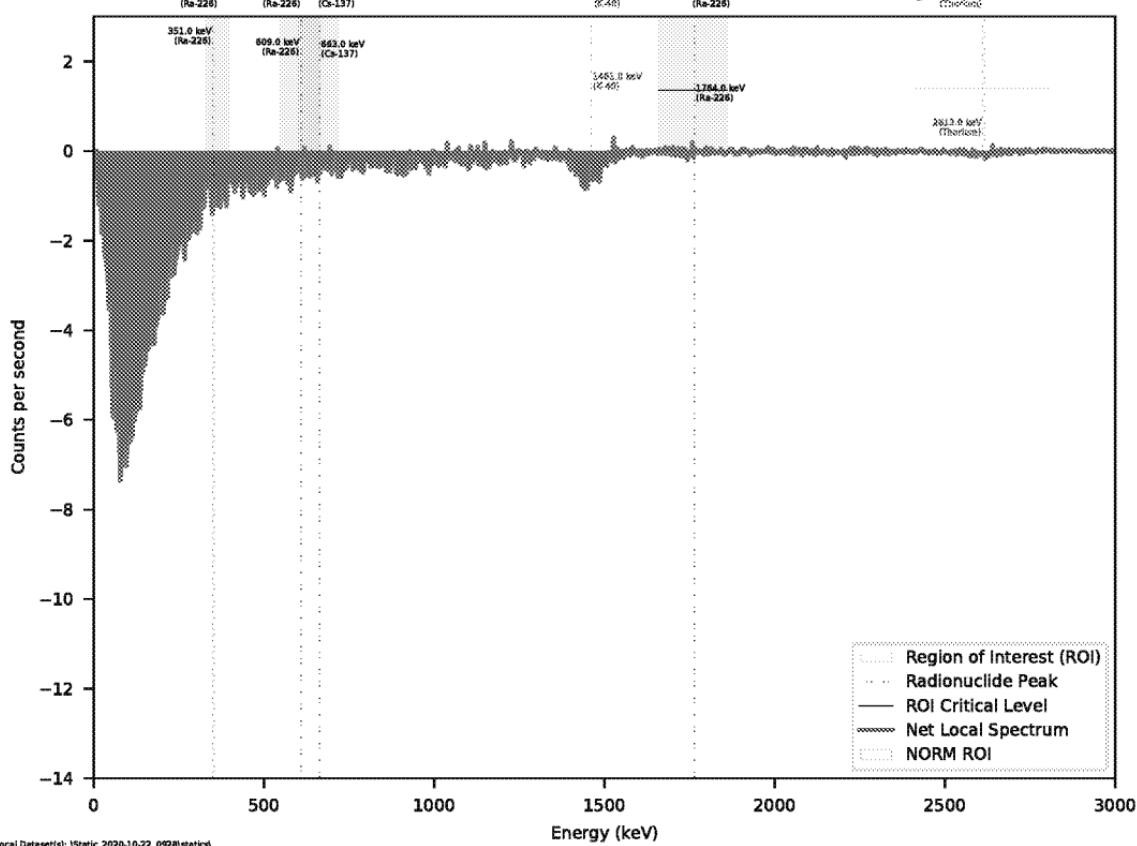
Page 21 of 114  
Circular



ED\_006360A\_00000350-00021

# Net Gamma Spectrum, Static Location: 9

Page 22 of 114



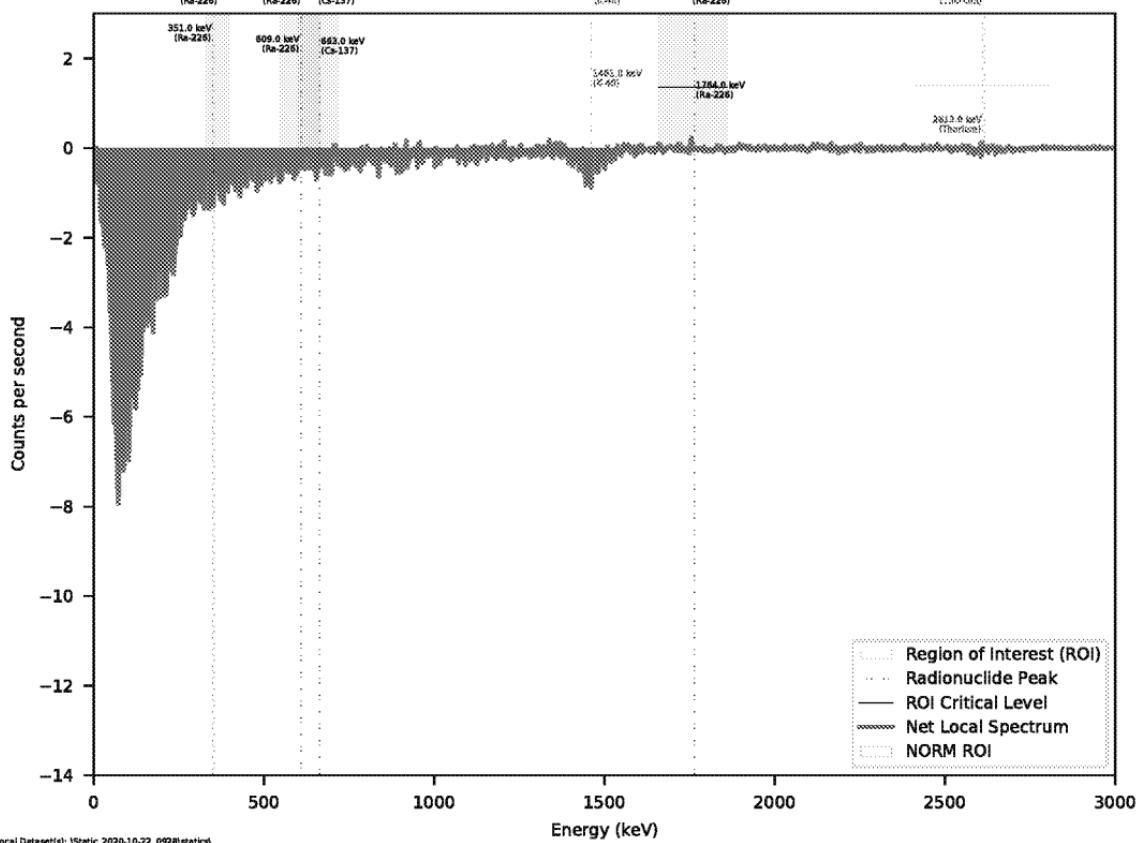
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36519924857145, 37.72243349142855

ED\_006360A\_00000350-00022

## Net Gamma Spectrum, Static Location: 10

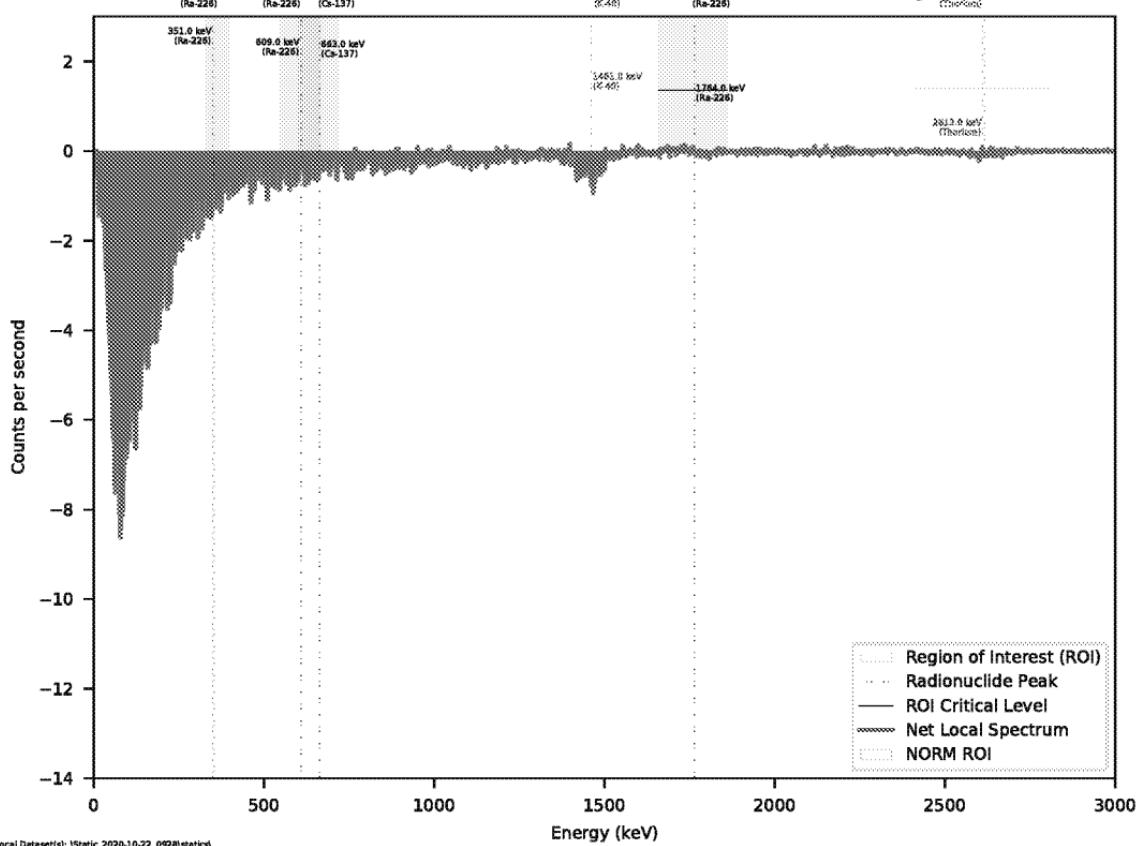
Page 23 of 114



ED\_006360A\_00000350-00023

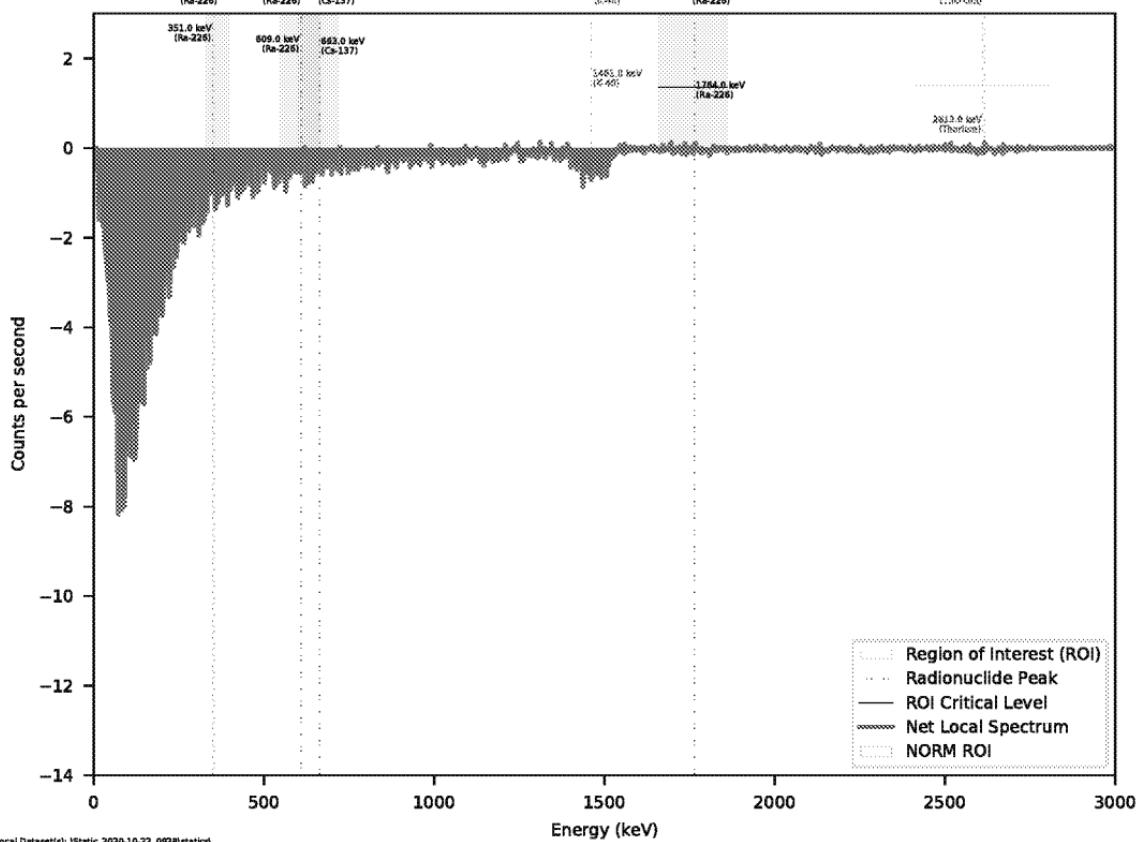
## Net Gamma Spectrum, Static Location: 11

Page 24 of 114



# Net Gamma Spectrum, Static Location: 12

Page 25 of 114  
Circular



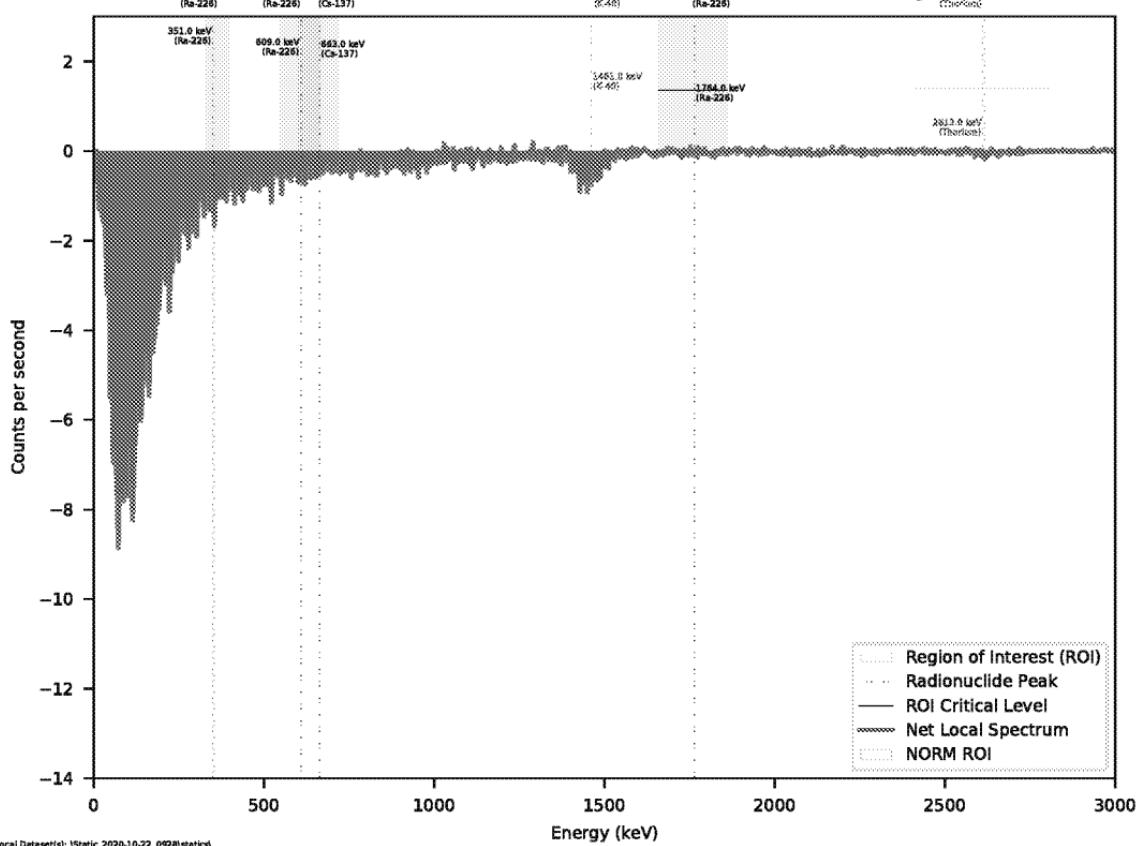
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36501087260271, 37.72253343424657

ED\_006360A\_00000350-00025

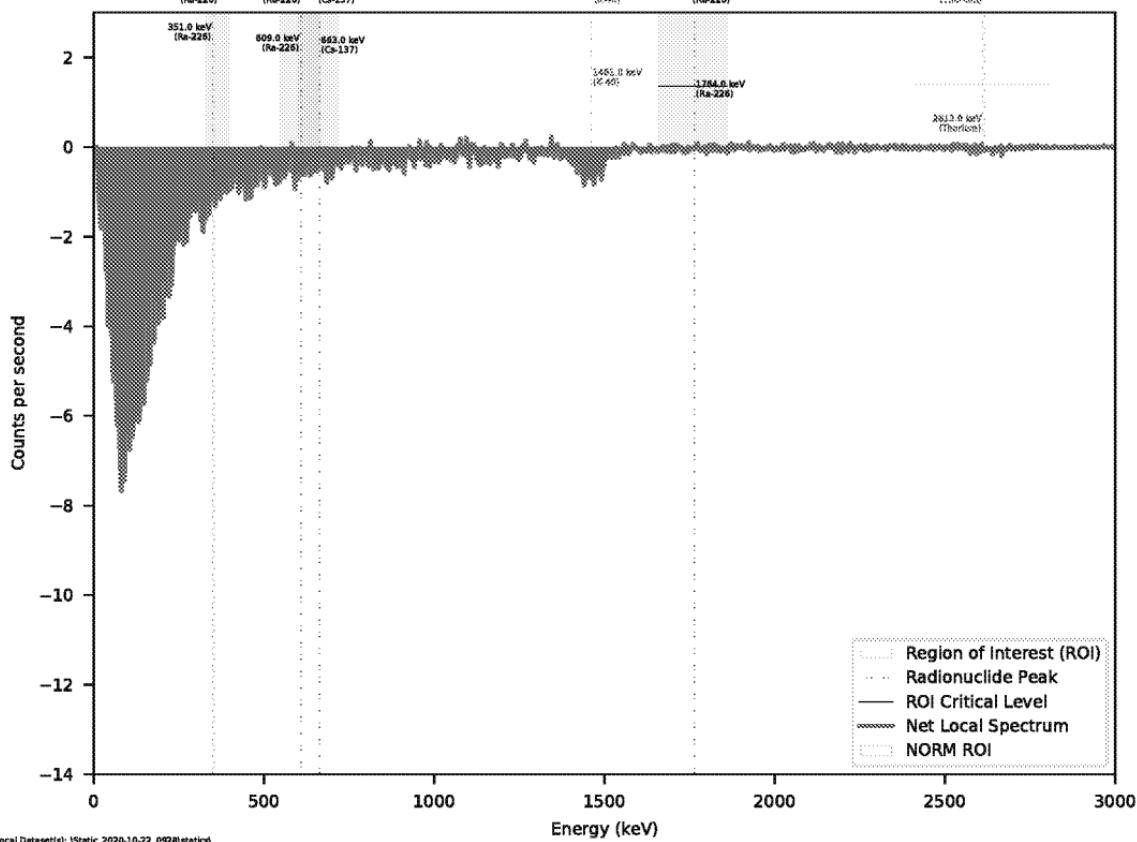
## Net Gamma Spectrum, Static Location: 13

Page 26 of 114



# Net Gamma Spectrum, Static Location: 14

Page 27 of 114  
of 114



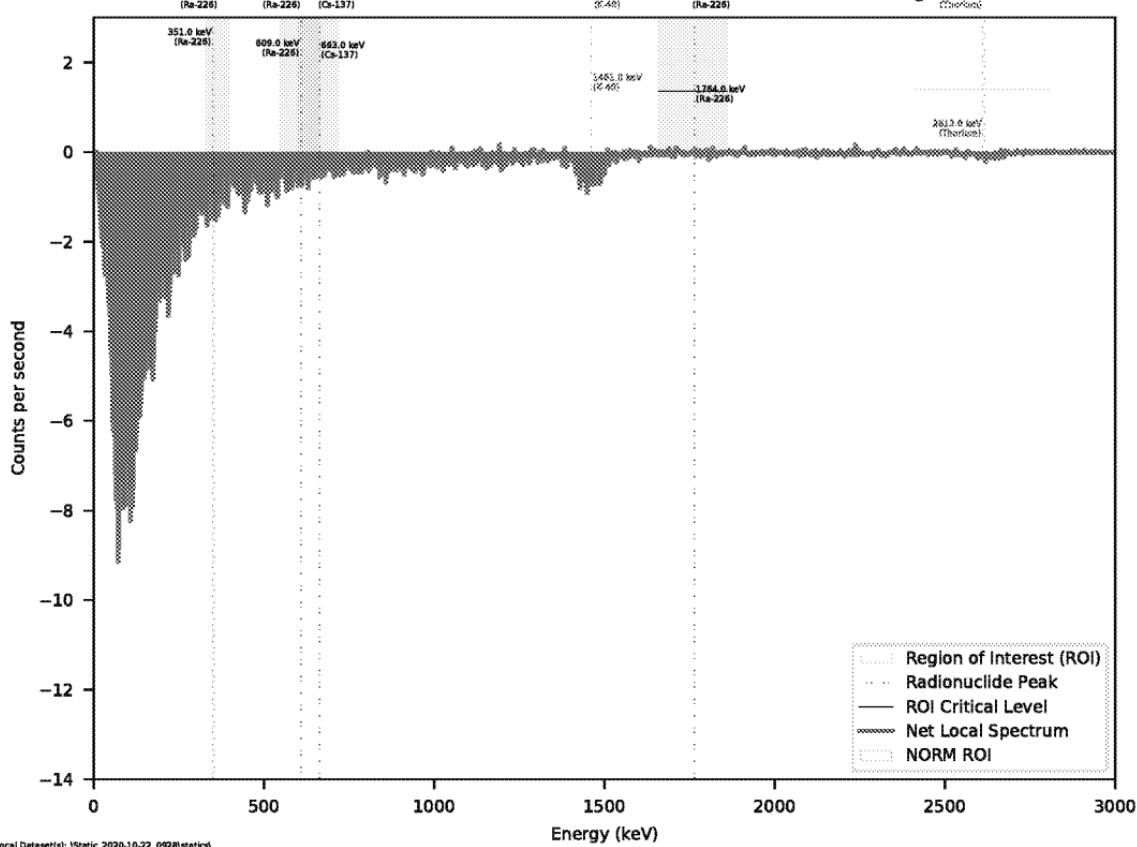
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3651834651515, 37.72242315303033

ED\_006360A\_00000350-00027

## Net Gamma Spectrum, Static Location: 15

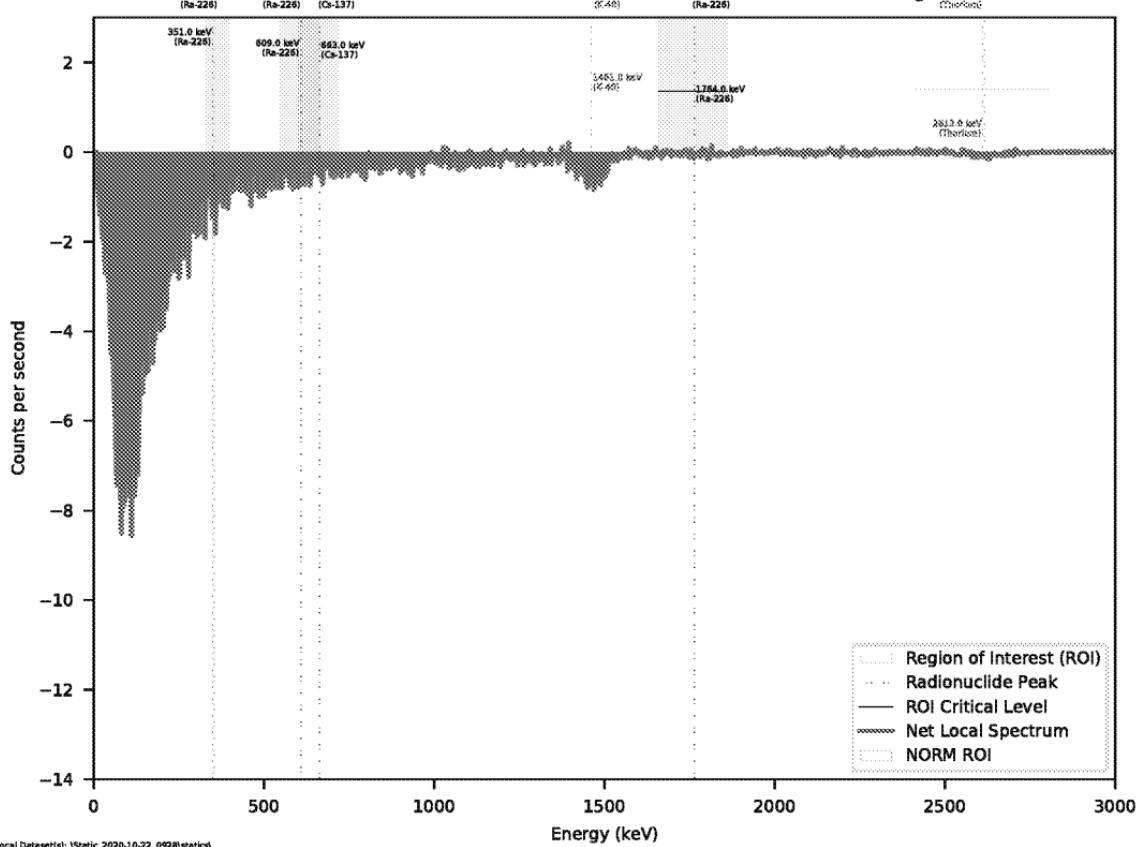
Page 28 of 114



ED\_006360A\_00000350-00028

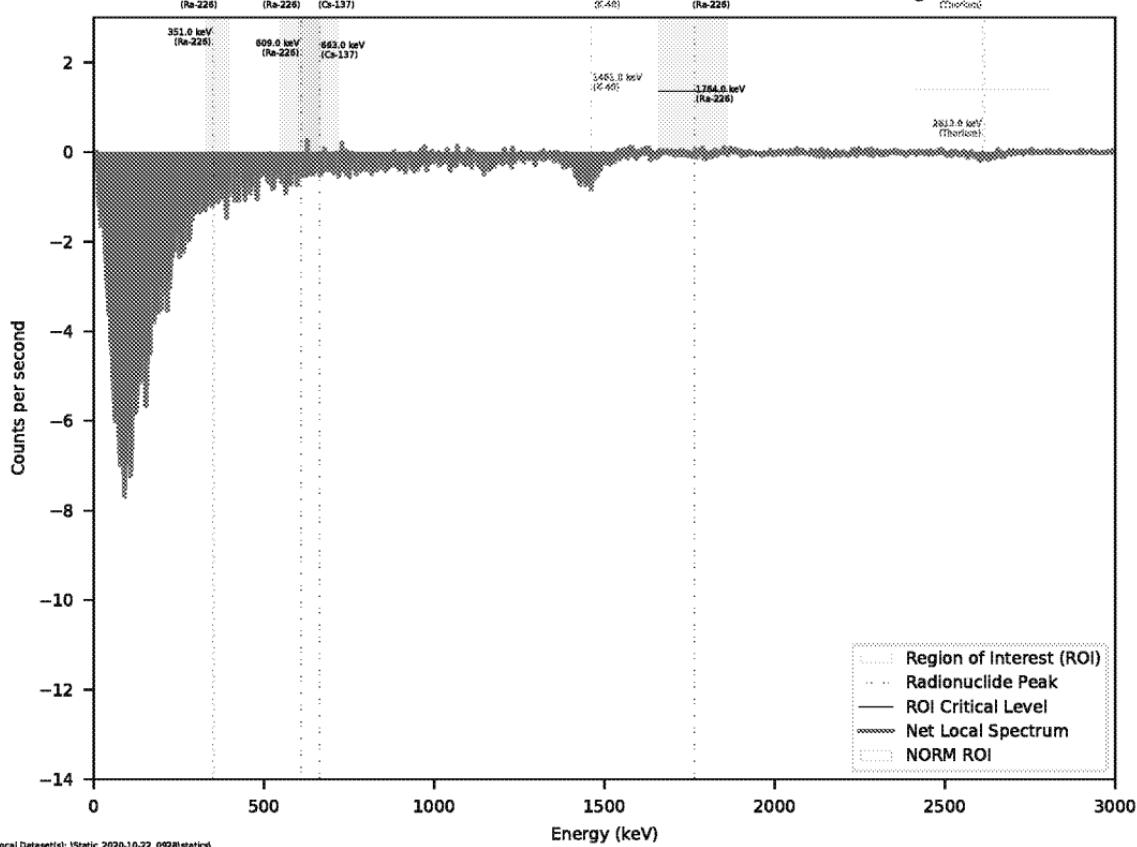
## Net Gamma Spectrum, Static Location: 16

Page 29 of 114



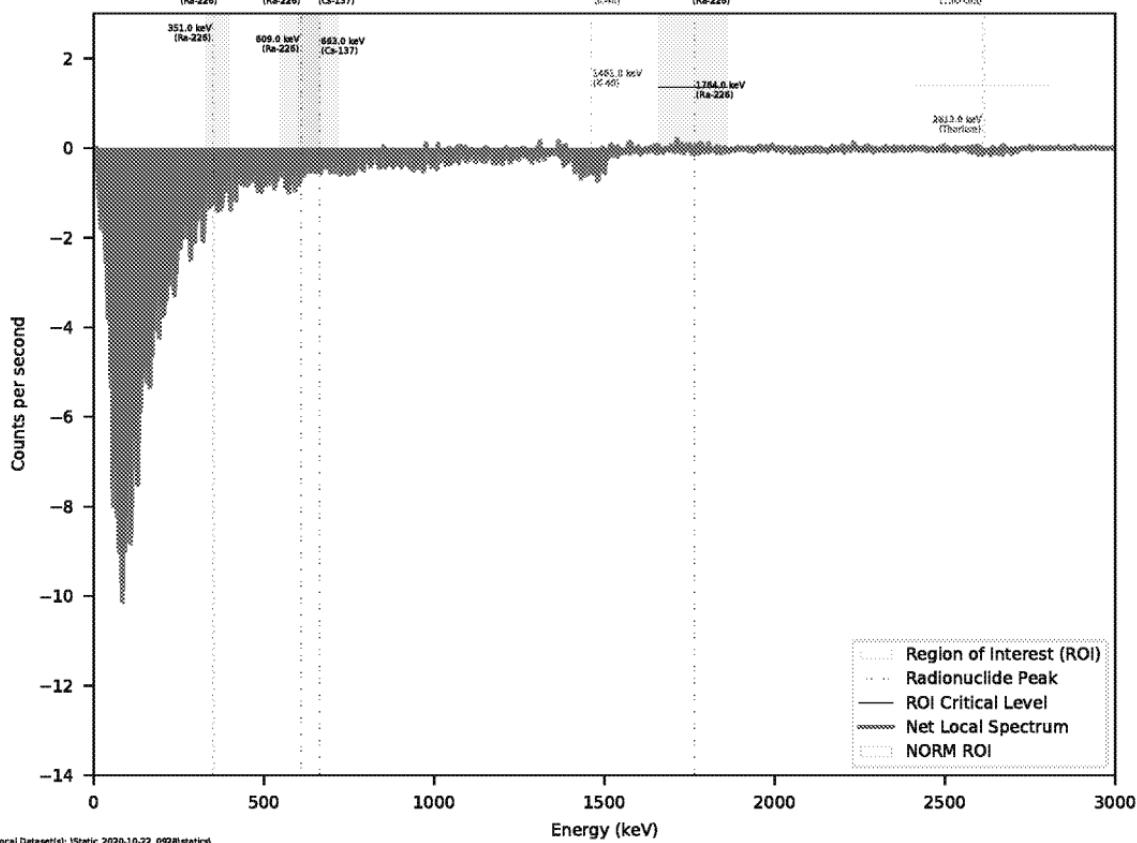
## Net Gamma Spectrum, Static Location: 17

Page 30 of 114



ED\_006360A\_00000350-00030

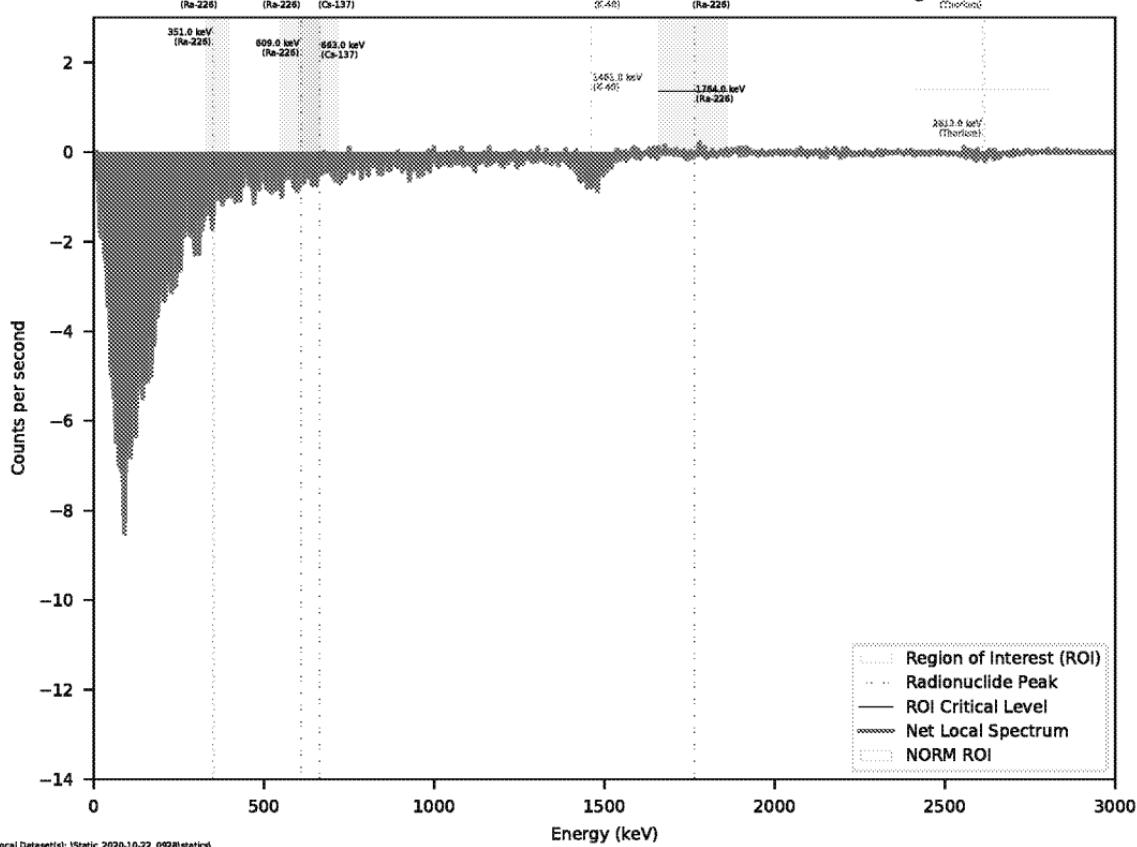
## Net Gamma Spectrum, Static Location: 18

Page 31 of 114  
Circular

ED\_006360A\_00000350-00031

## Net Gamma Spectrum, Static Location: 19

Page 32 of 114



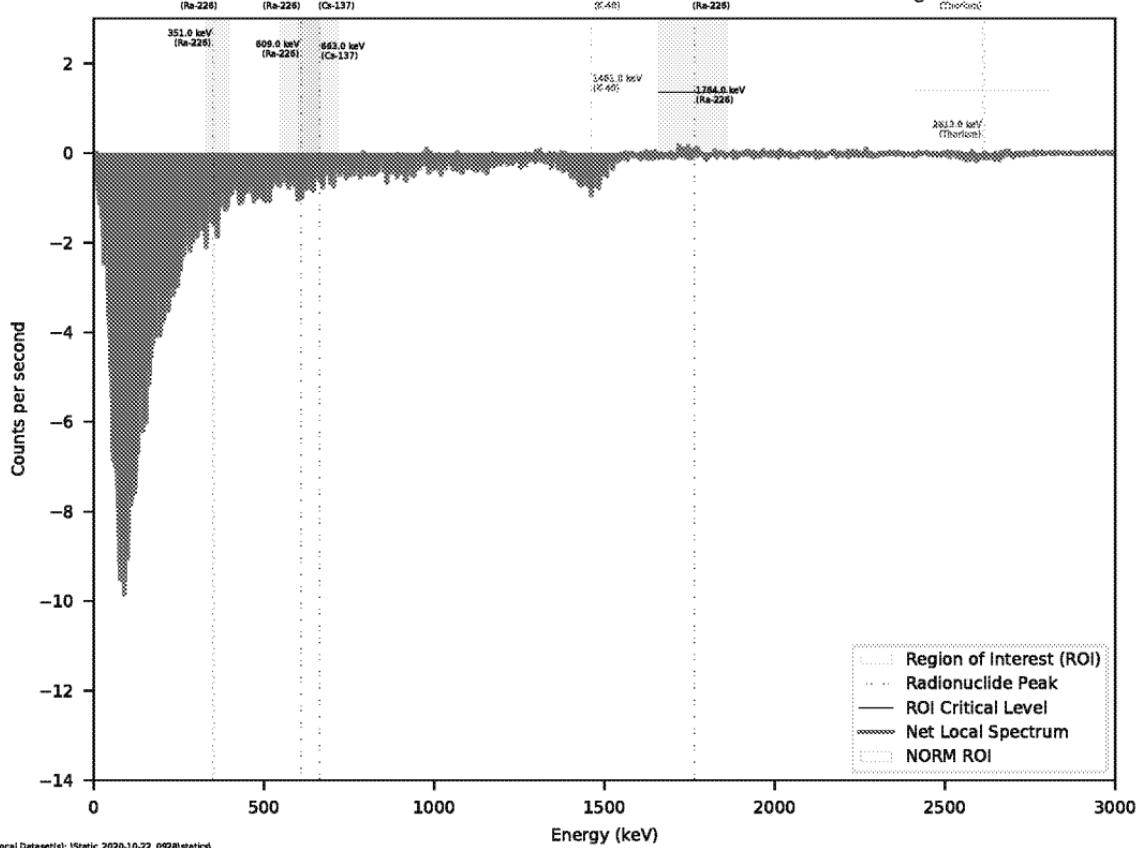
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36519020769234, 37.72240780769232

ED\_006360A\_00000350-00032

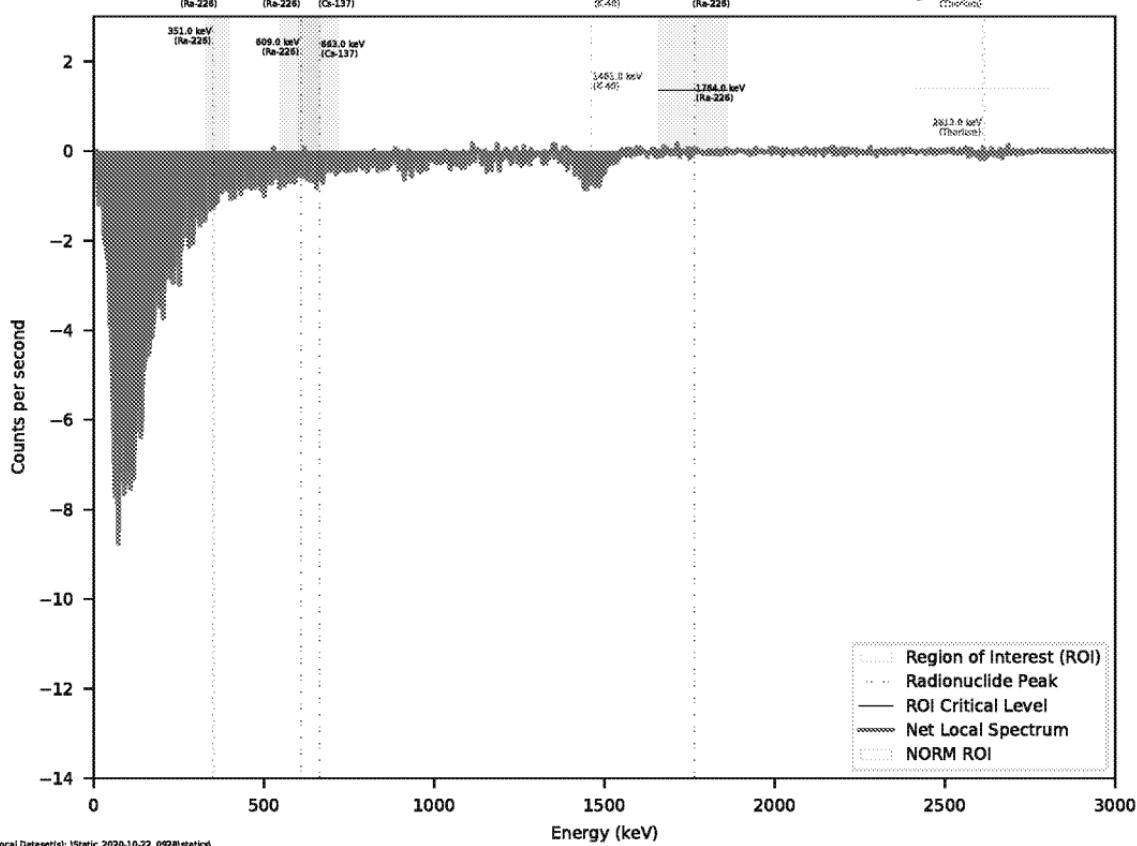
## Net Gamma Spectrum, Static Location: 20

Page 33 of 114



## Net Gamma Spectrum, Static Location: 21

Page 34 of 114



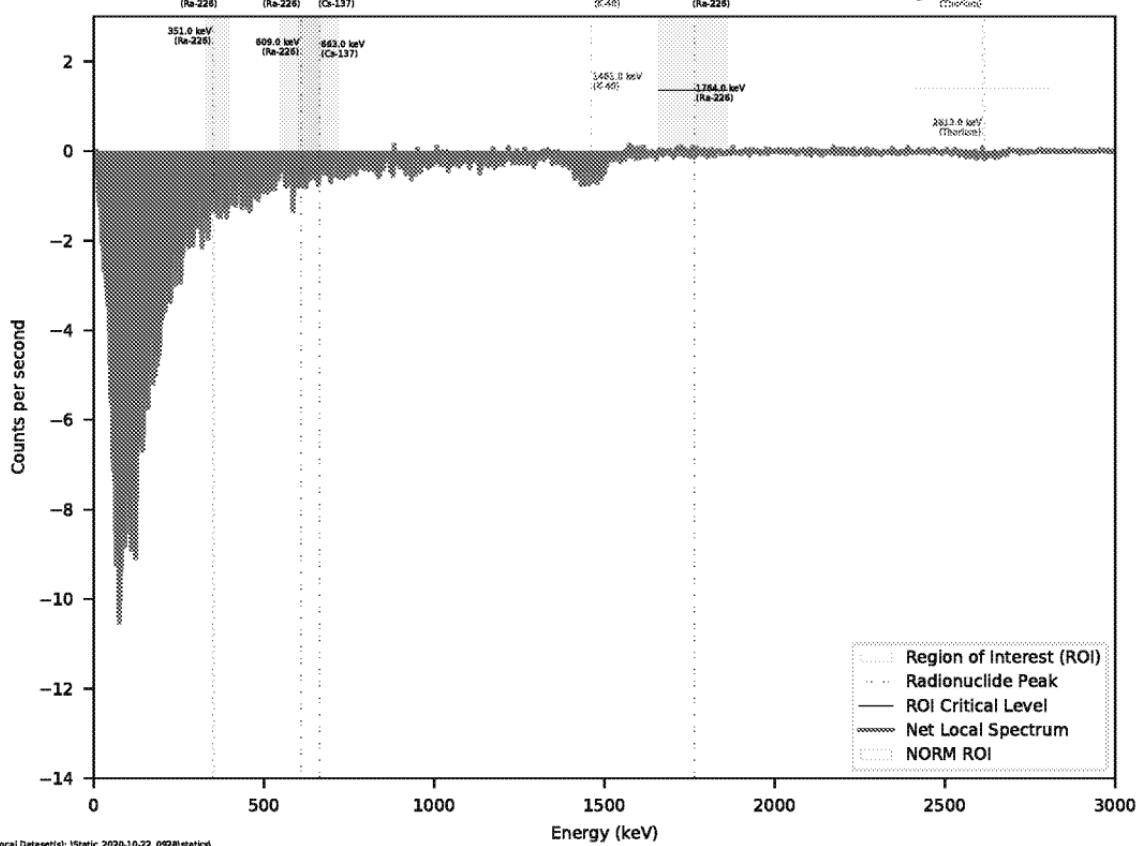
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36500923134327, 37.722503359701484

ED\_006360A\_00000350-00034

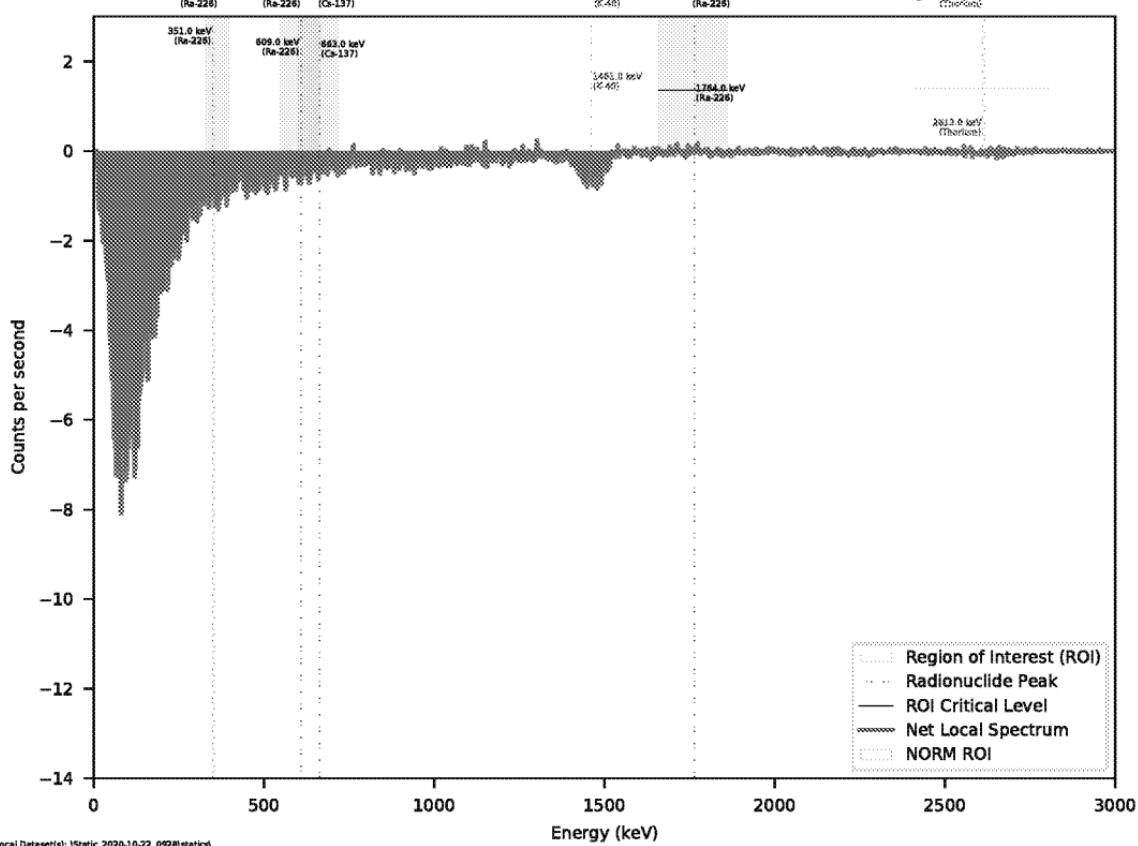
# Net Gamma Spectrum, Static Location: 22

Page 35 of 114



# Net Gamma Spectrum, Static Location: 23

Page 36 of 114

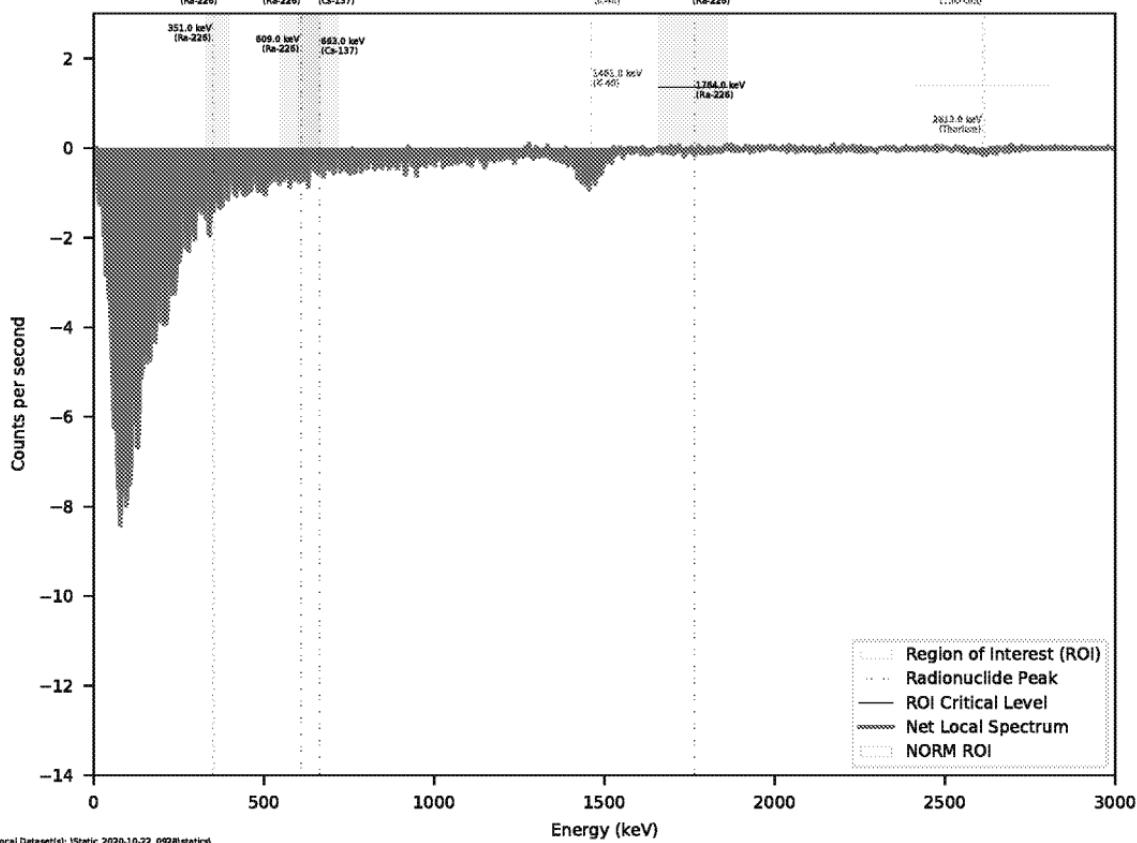


Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36497974157904, 37.72245925789474

ED\_006360A\_00000350-00036

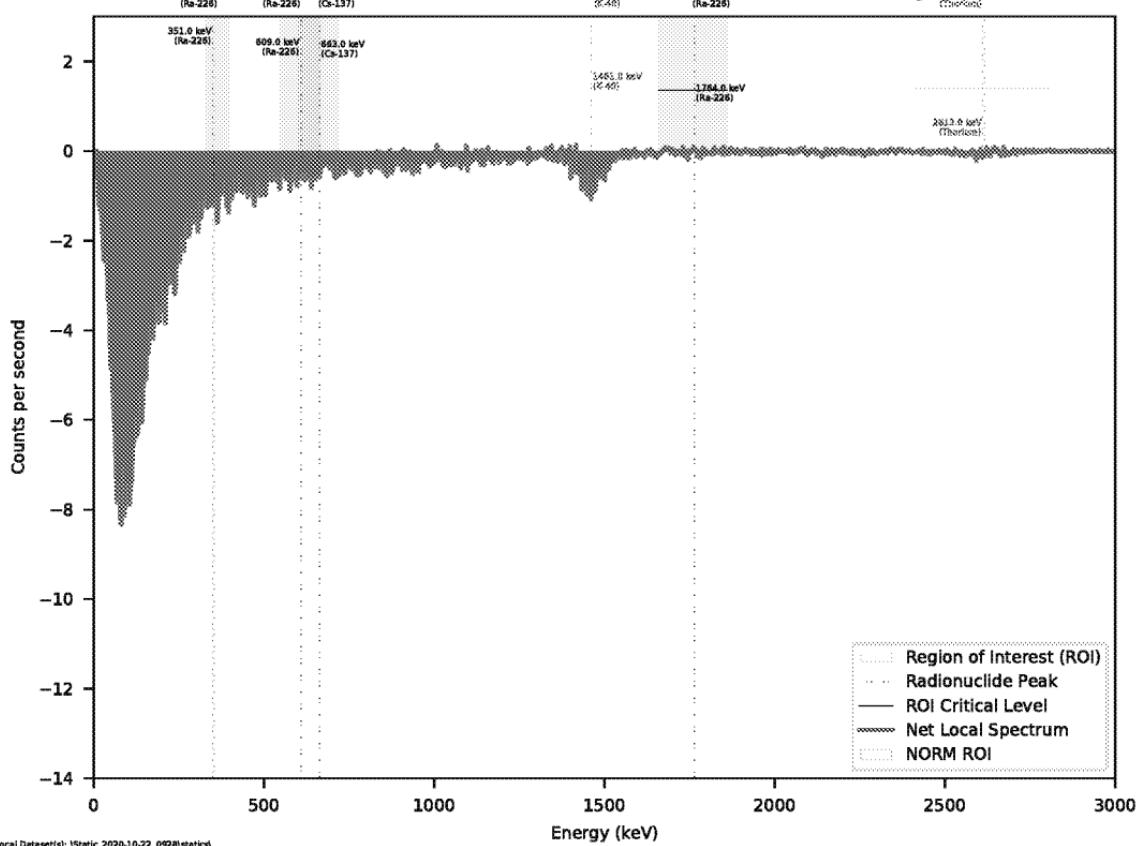
## Net Gamma Spectrum, Static Location: 24

Page 37 of 114  
Circular

ED\_006360A\_00000350-00037

## Net Gamma Spectrum, Static Location: 25

Page 38 of 114



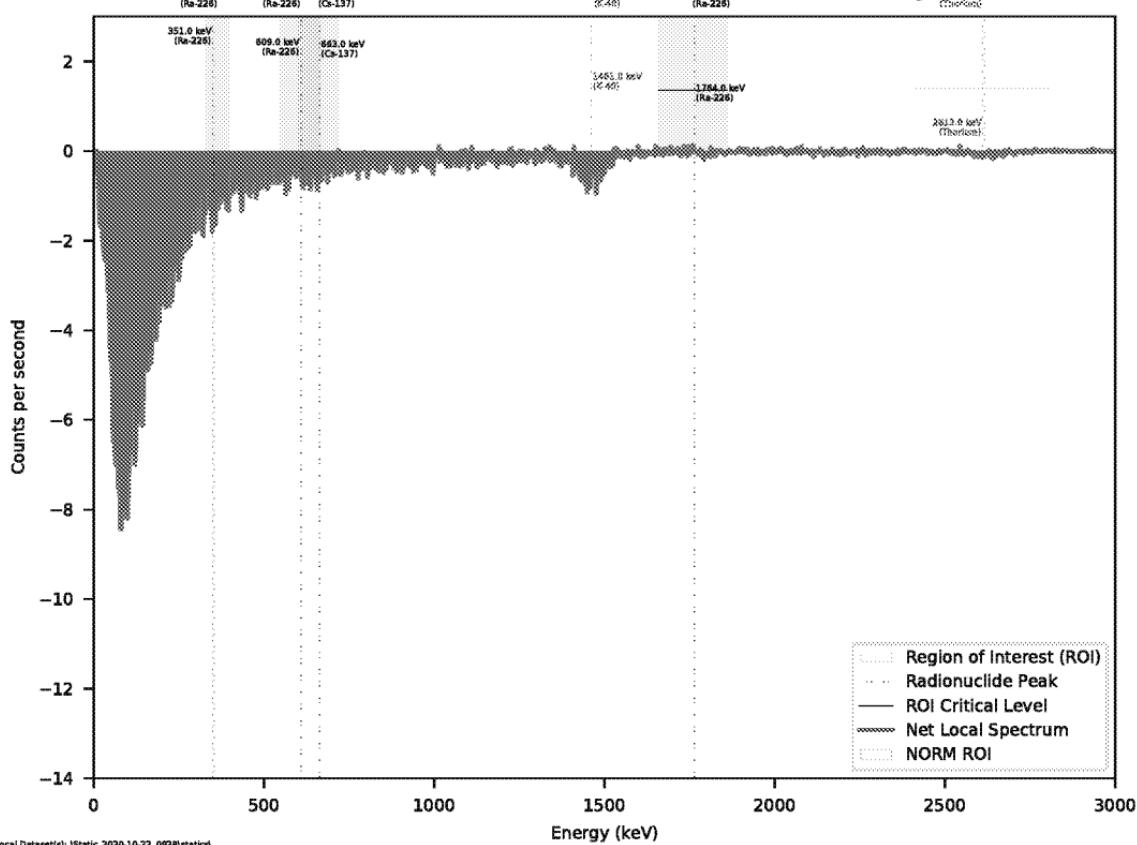
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36501000088966, 37.72258314837662

ED\_006360A\_00000350-00038

## Net Gamma Spectrum, Static Location: 26

Page 39 of 114



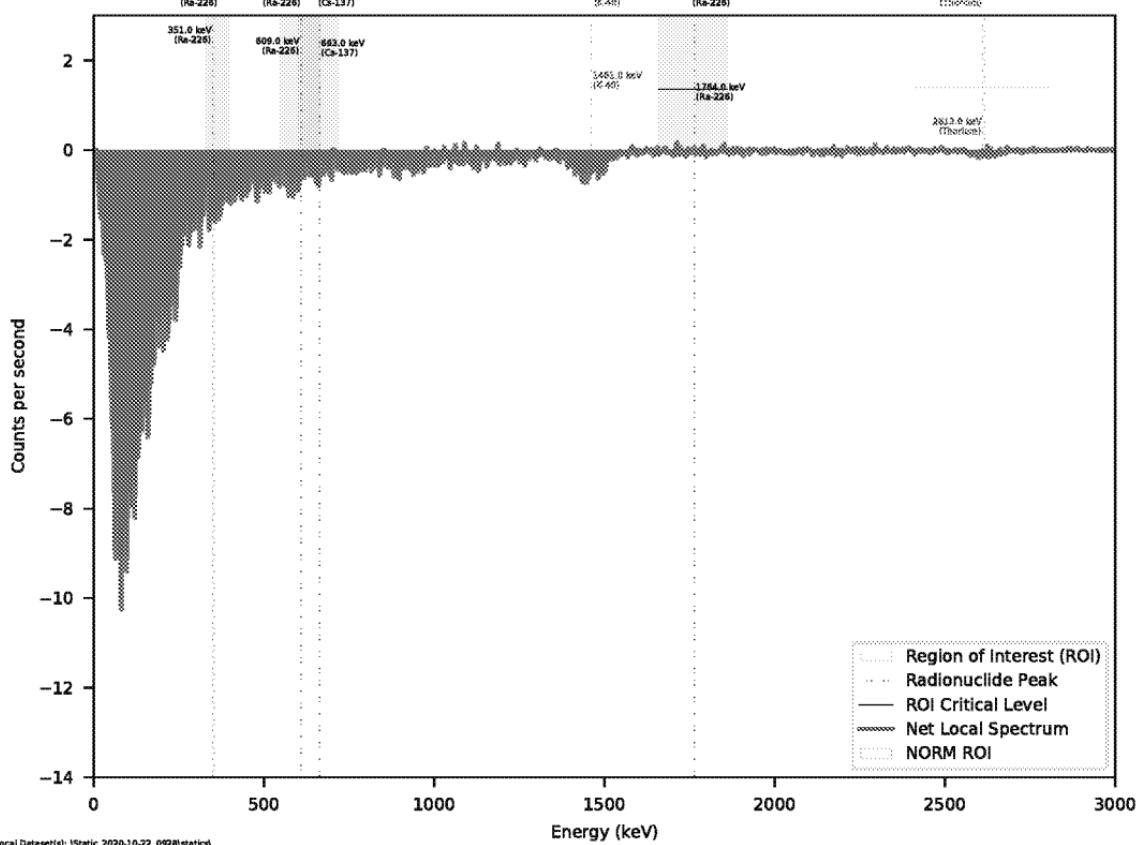
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36496179583338, 37.72246235833331

ED\_006360A\_00000350-00039

# Net Gamma Spectrum, Static Location: 27

Page 40 of 114



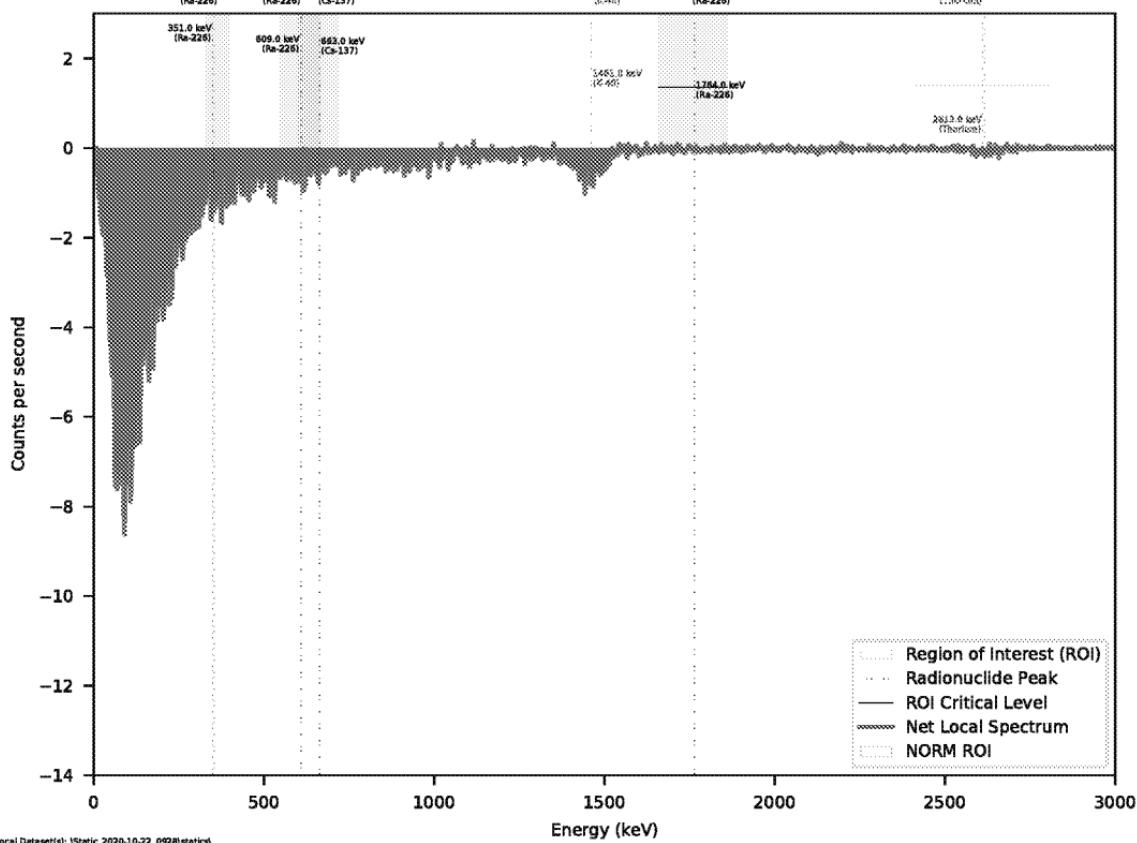
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36507926521733, 37.72261207826065

ED\_006360A\_00000350-00040

## Net Gamma Spectrum, Static Location: 28

Page 41 of 114



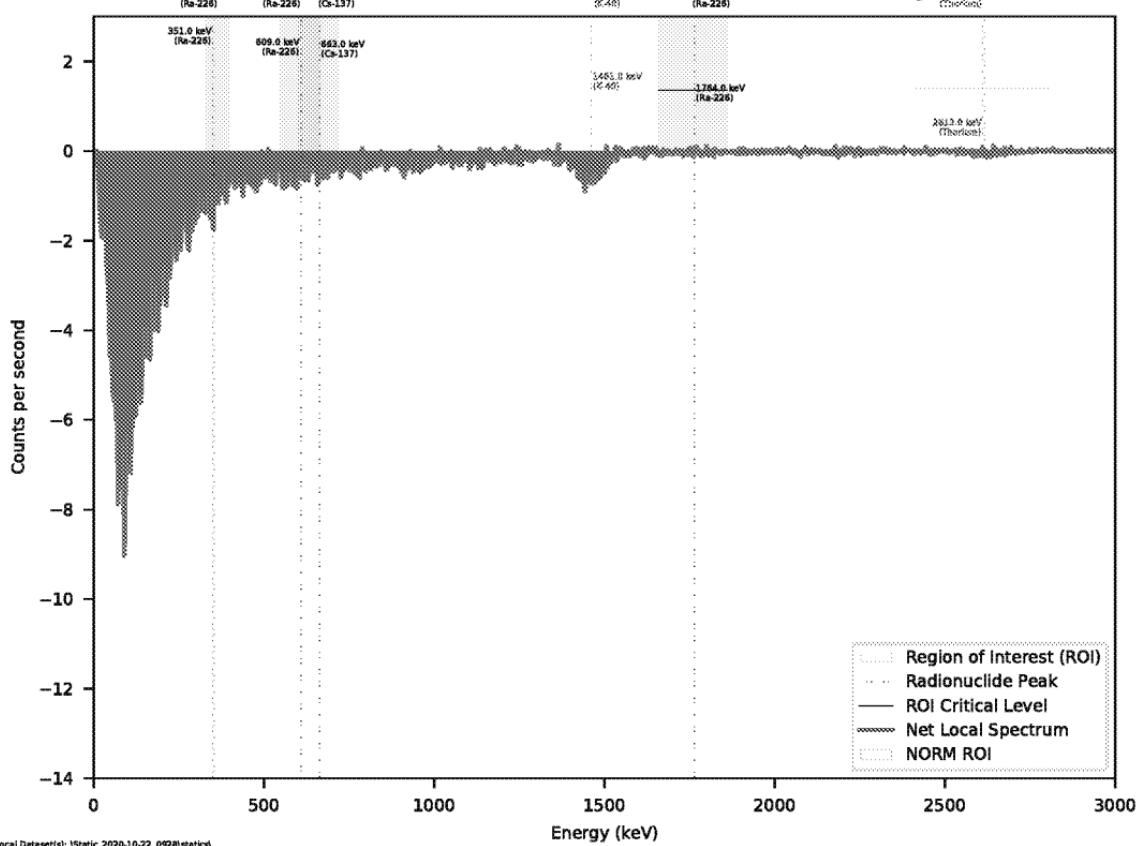
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36498015420887, 37.72252334626862

ED\_006360A\_00000350-00041

## Net Gamma Spectrum, Static Location: 29

Page 42 of 114



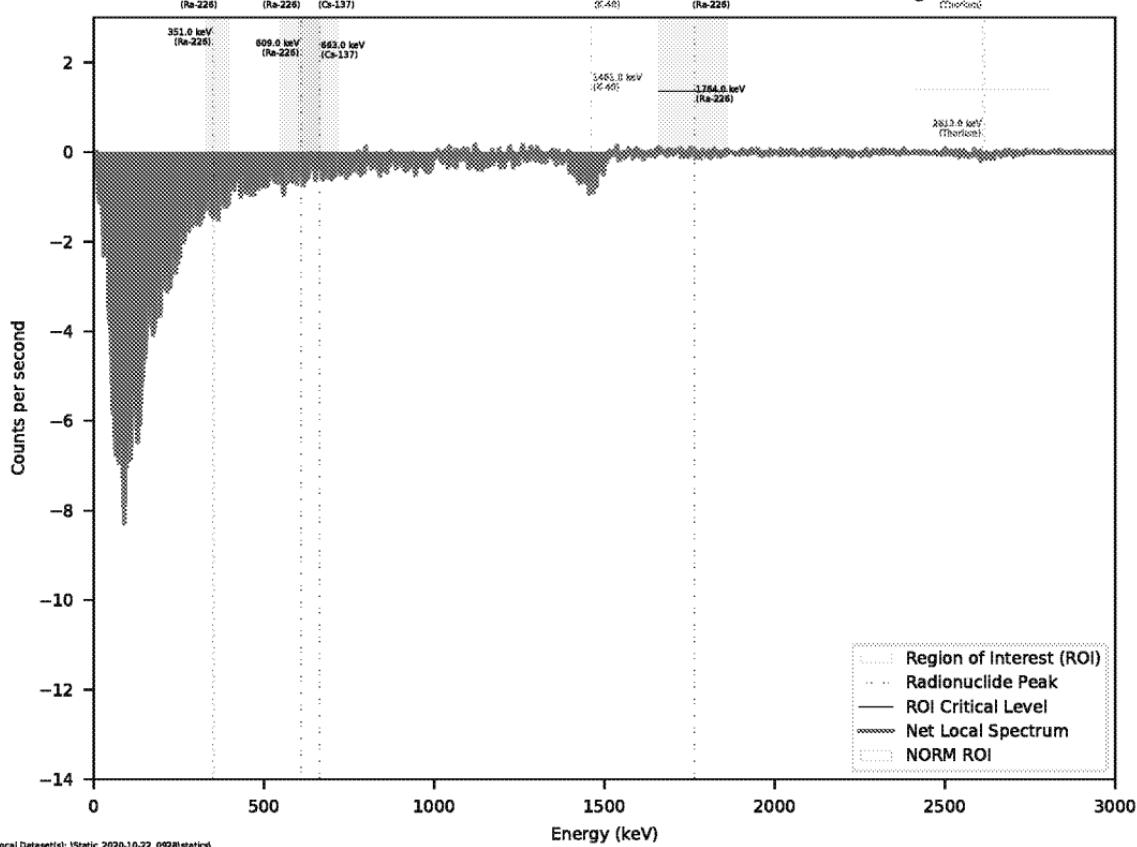
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilNBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3651932797102, 37.72244481014493

ED\_006360A\_00000350-00042

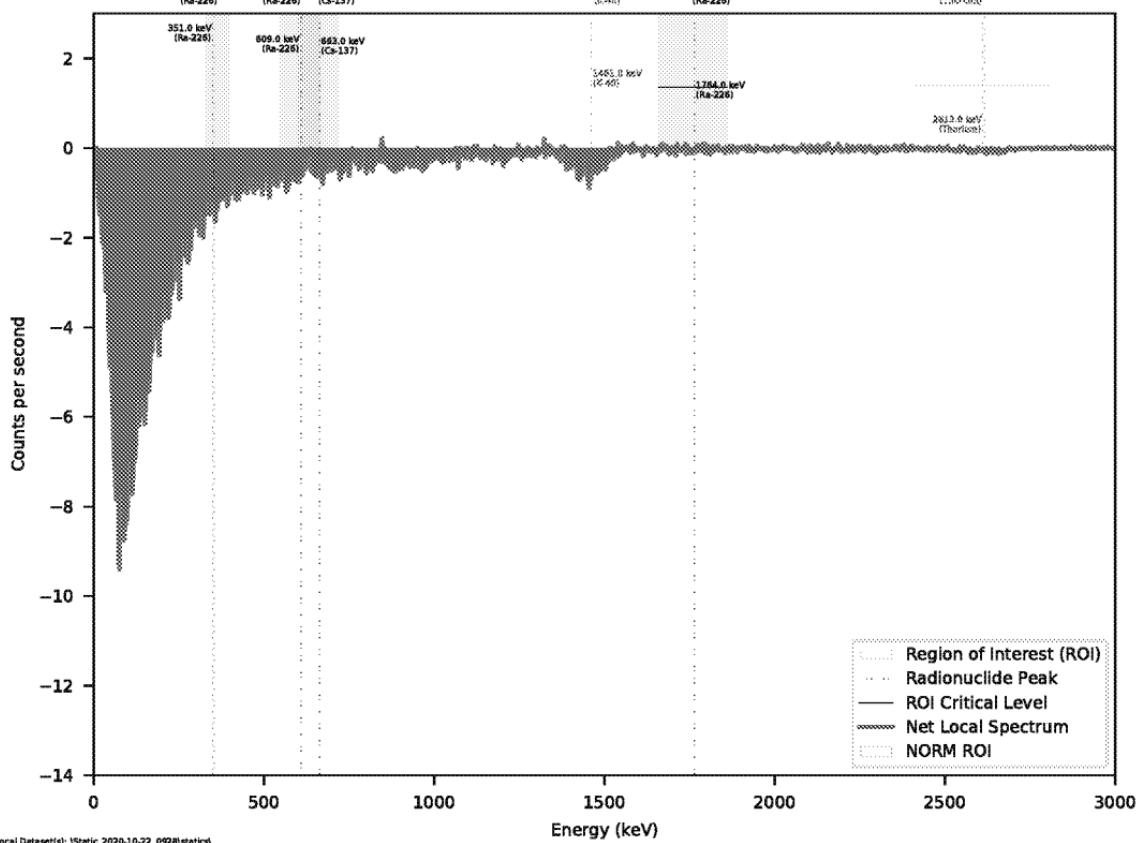
## Net Gamma Spectrum, Static Location: 30

Page 43 of 114



## Net Gamma Spectrum, Static Location: 31

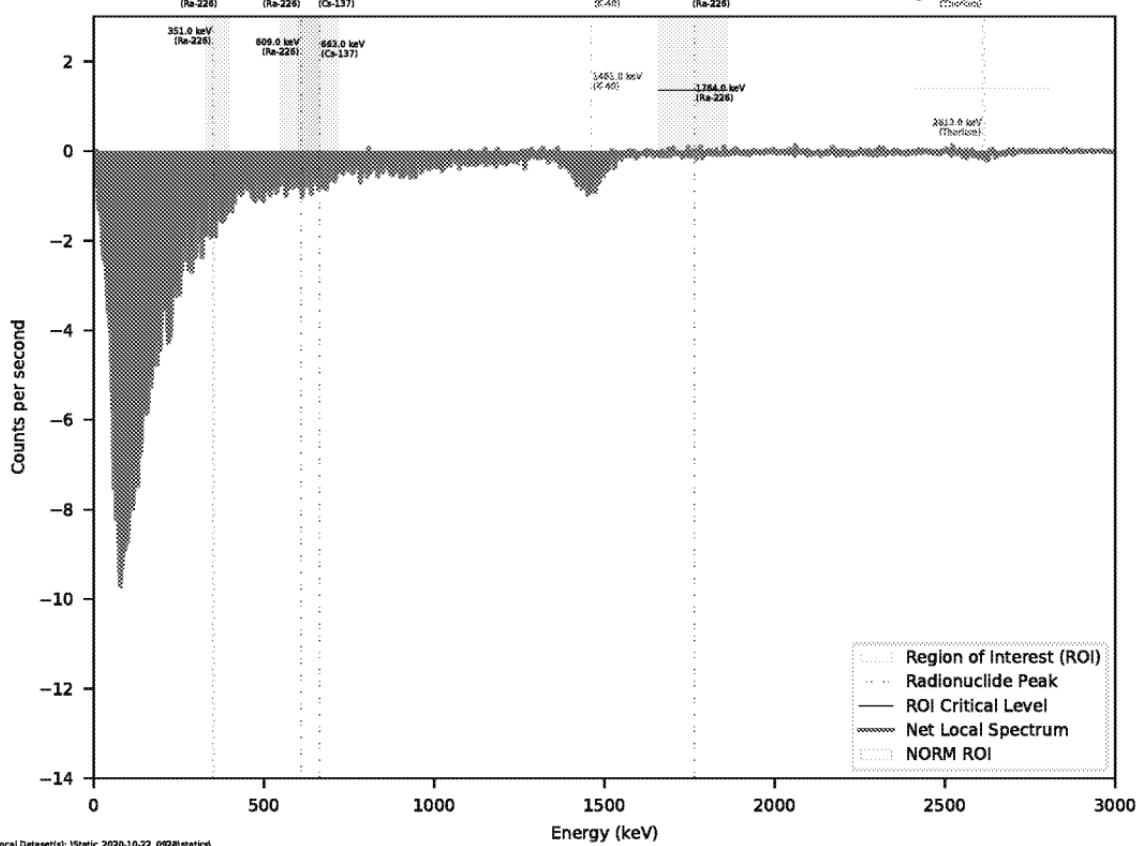
Page 44 of 114



ED\_006360A\_00000350-00044

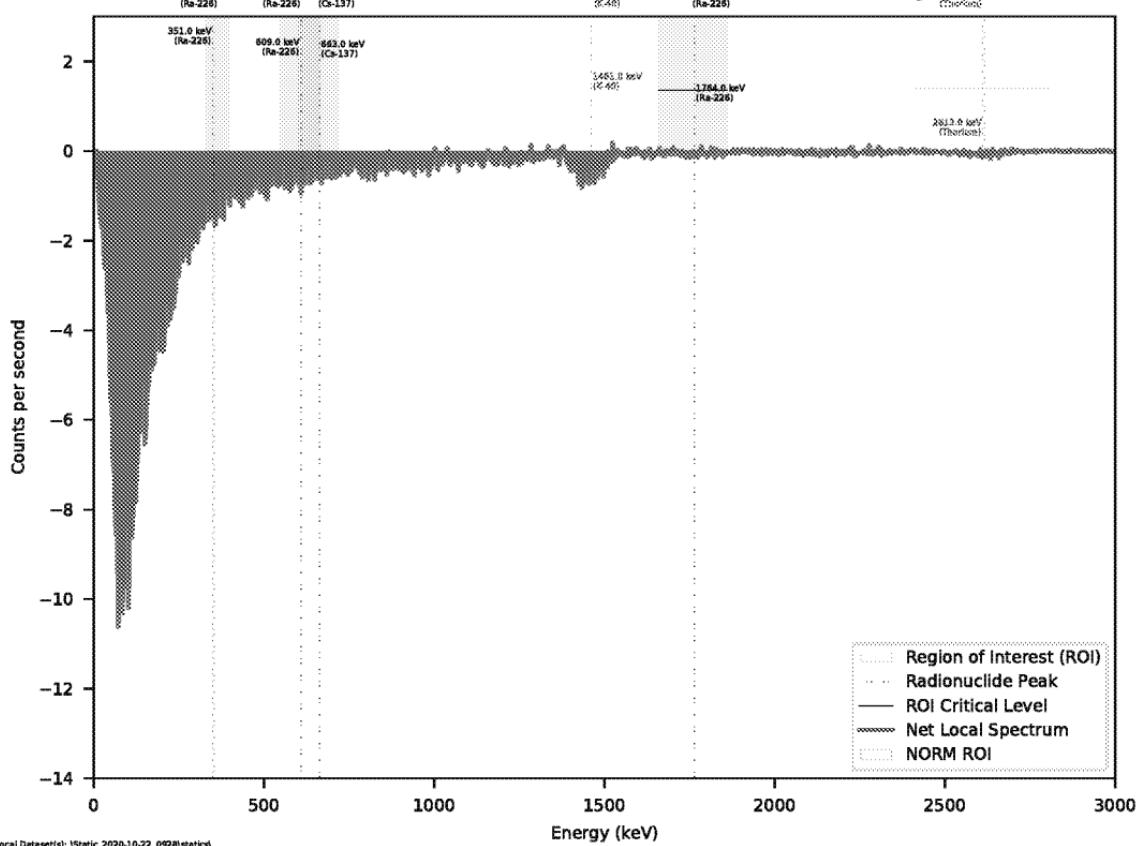
## Net Gamma Spectrum, Static Location: 32

Page 45 of 114



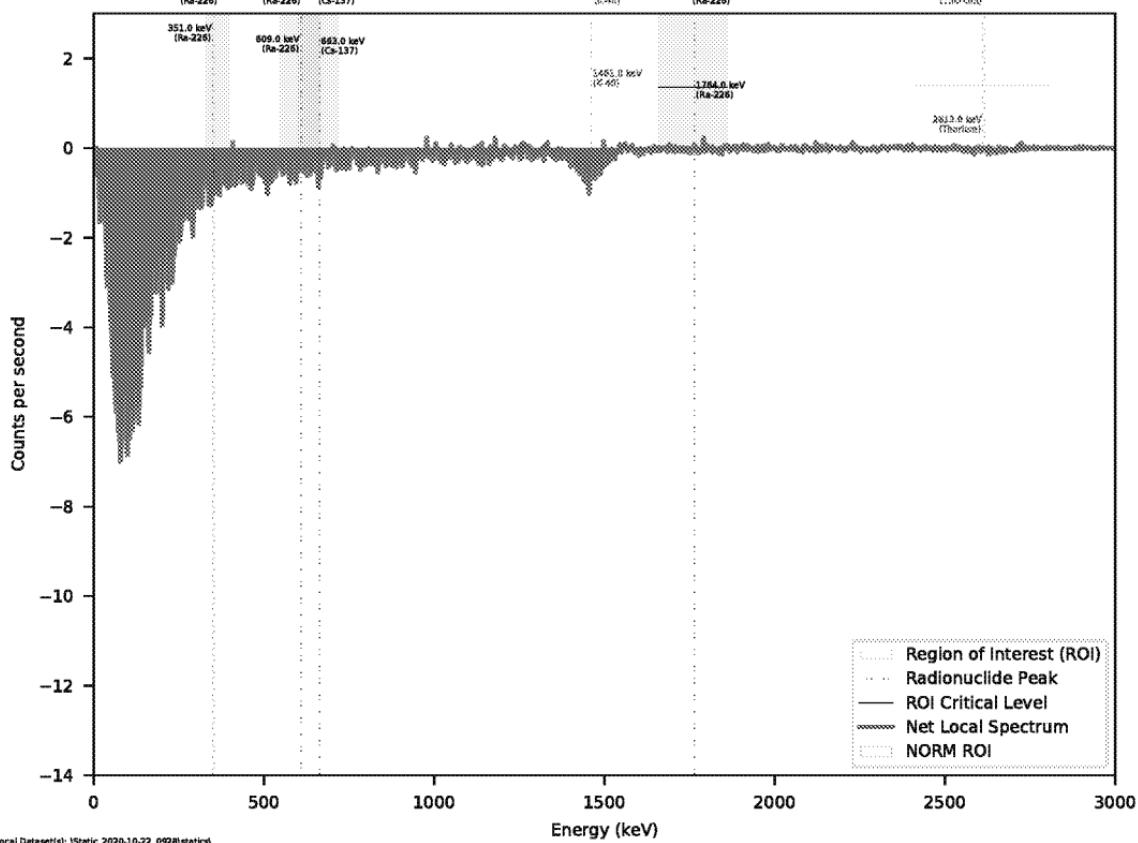
## Net Gamma Spectrum, Static Location: 33

Page 46 of 114



## Net Gamma Spectrum, Static Location: 34

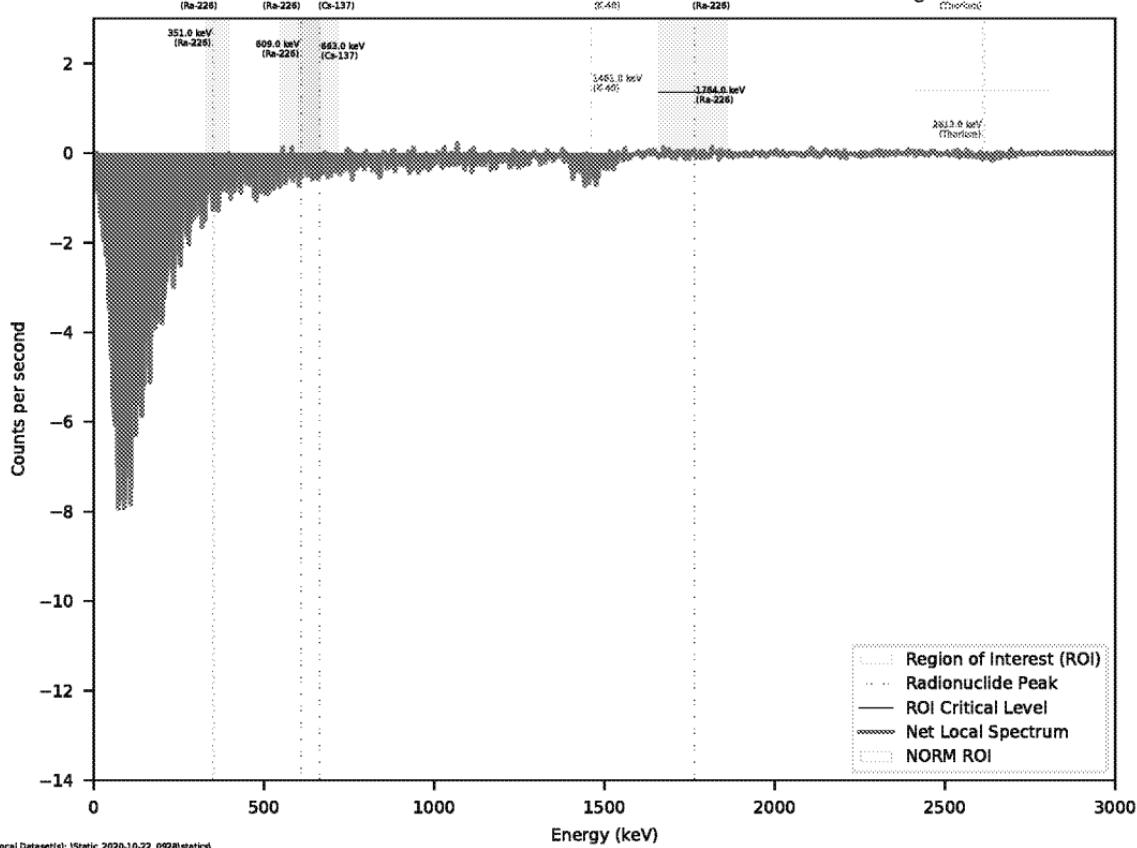
Page 47 of 114



ED\_006360A\_00000350-00047

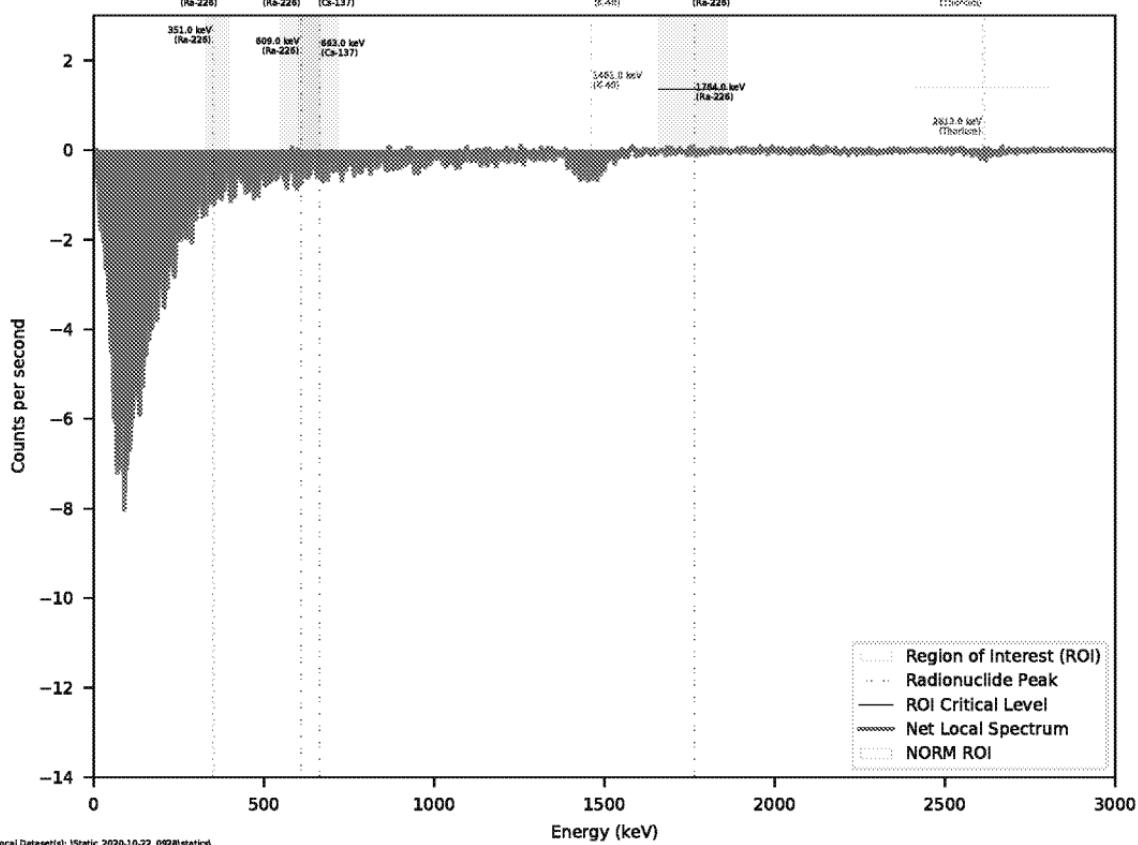
## Net Gamma Spectrum, Static Location: 35

Page 48 of 114



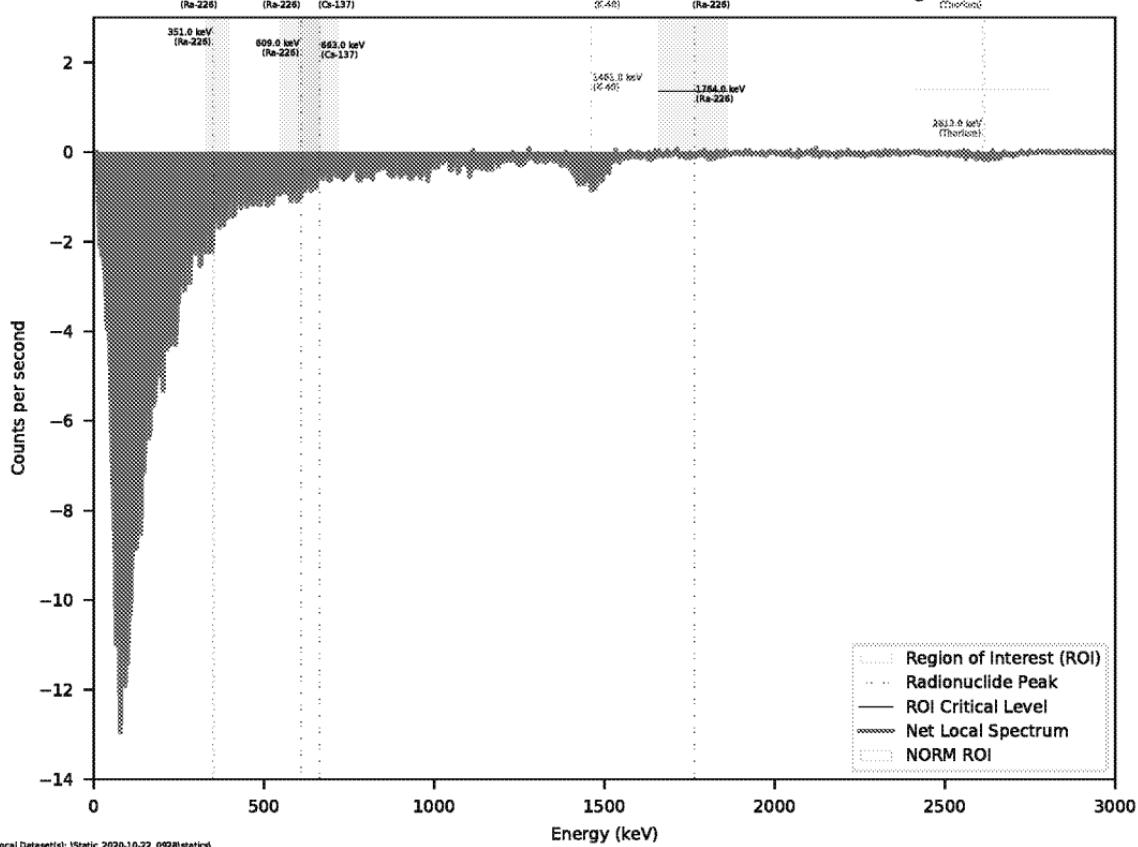
## Net Gamma Spectrum, Static Location: 36

Page 49 of 114



## Net Gamma Spectrum, Static Location: 37

Page 50 of 114



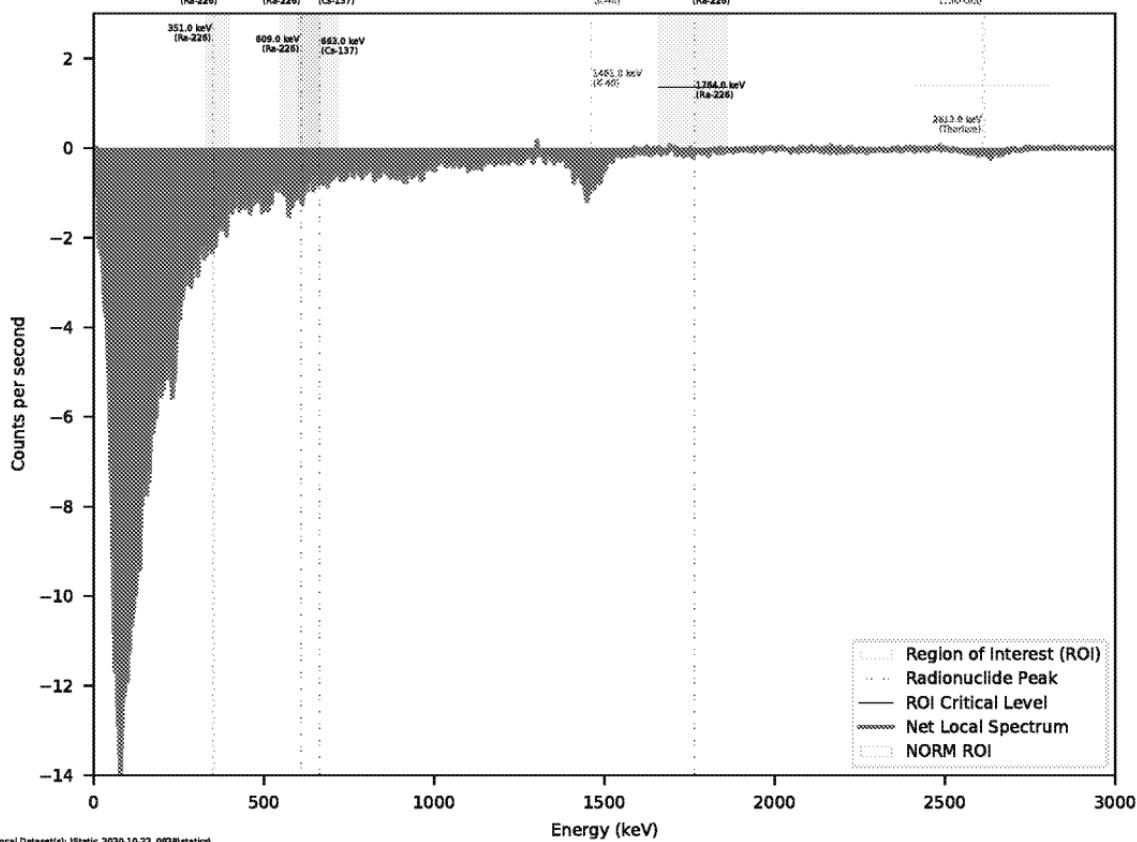
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3651128709678, 37.722573516128046

ED\_006360A\_00000350-00050

## Net Gamma Spectrum, Static Location: 38

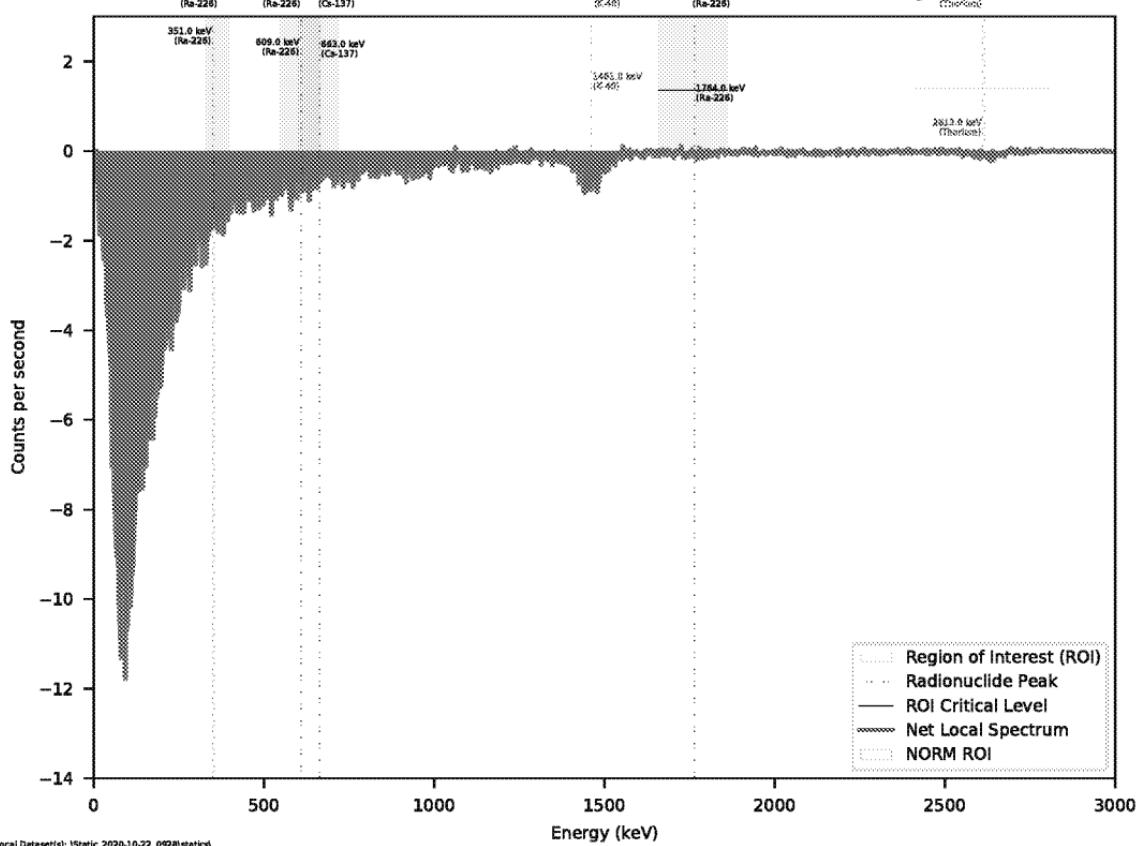
Page 51 of 114



ED\_006360A\_00000350-00051

## Net Gamma Spectrum, Static Location: 39

Page 52 of 114



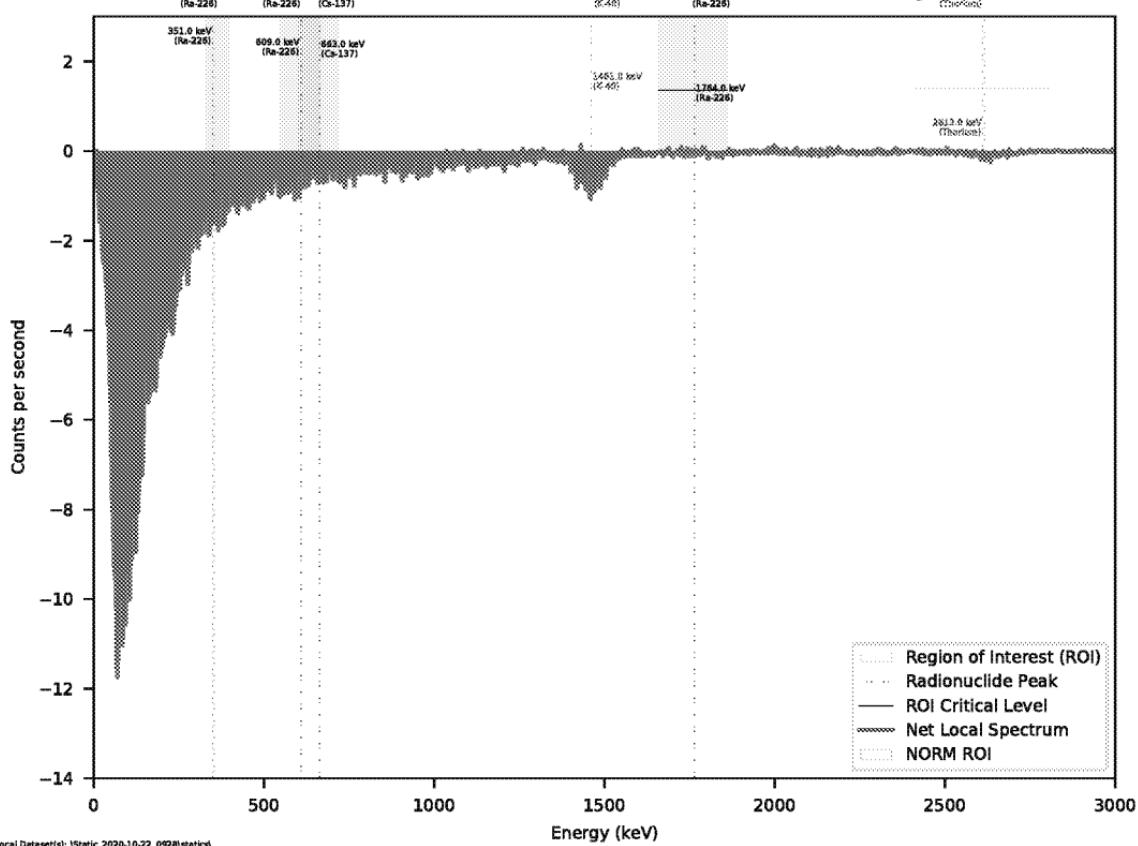
Local Dataset(s): lStatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilNBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36515621230766, 37.7224406986231

ED\_006360A\_00000350-00052

## Net Gamma Spectrum, Static Location: 40

Page 53 of 114



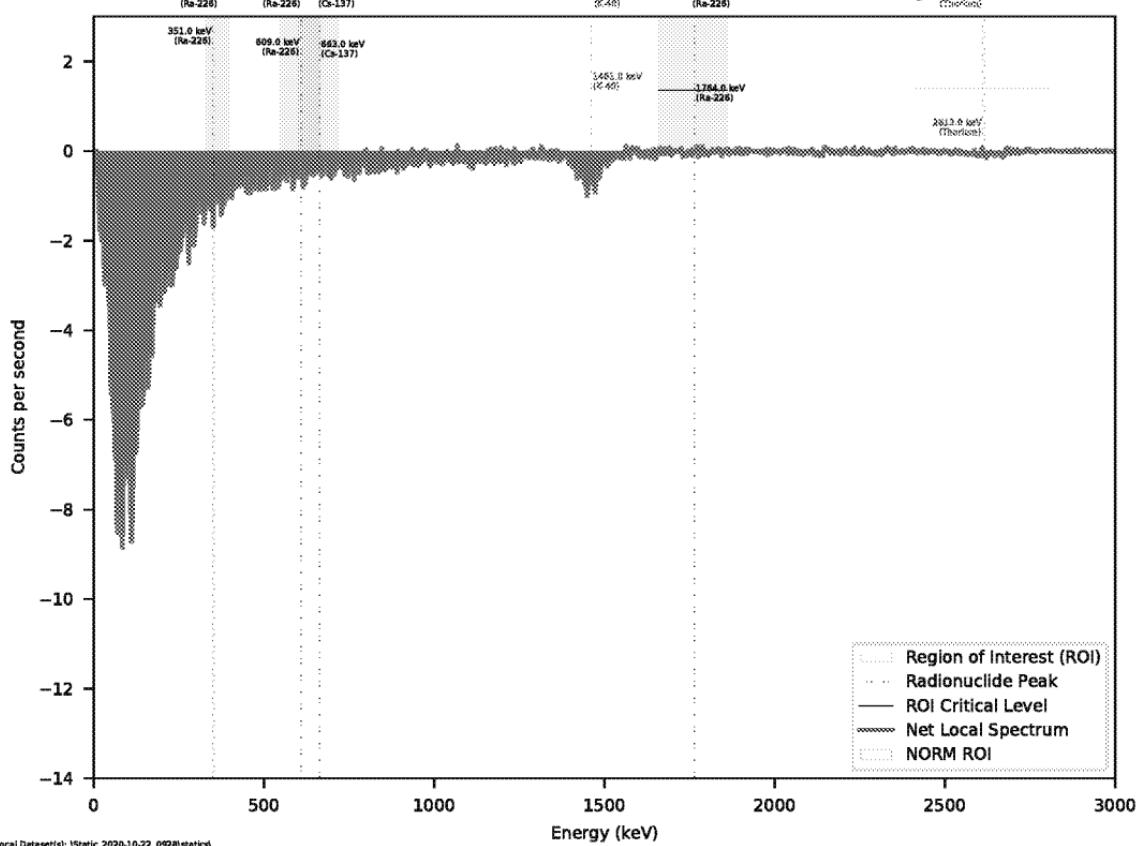
Local Dataset(s): lstatic\_2020-10-22\_0928/static/  
Background Dataset(s): RSII\_SoilNBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36501727499984, 37.722626433823514

ED\_006360A\_00000350-00053

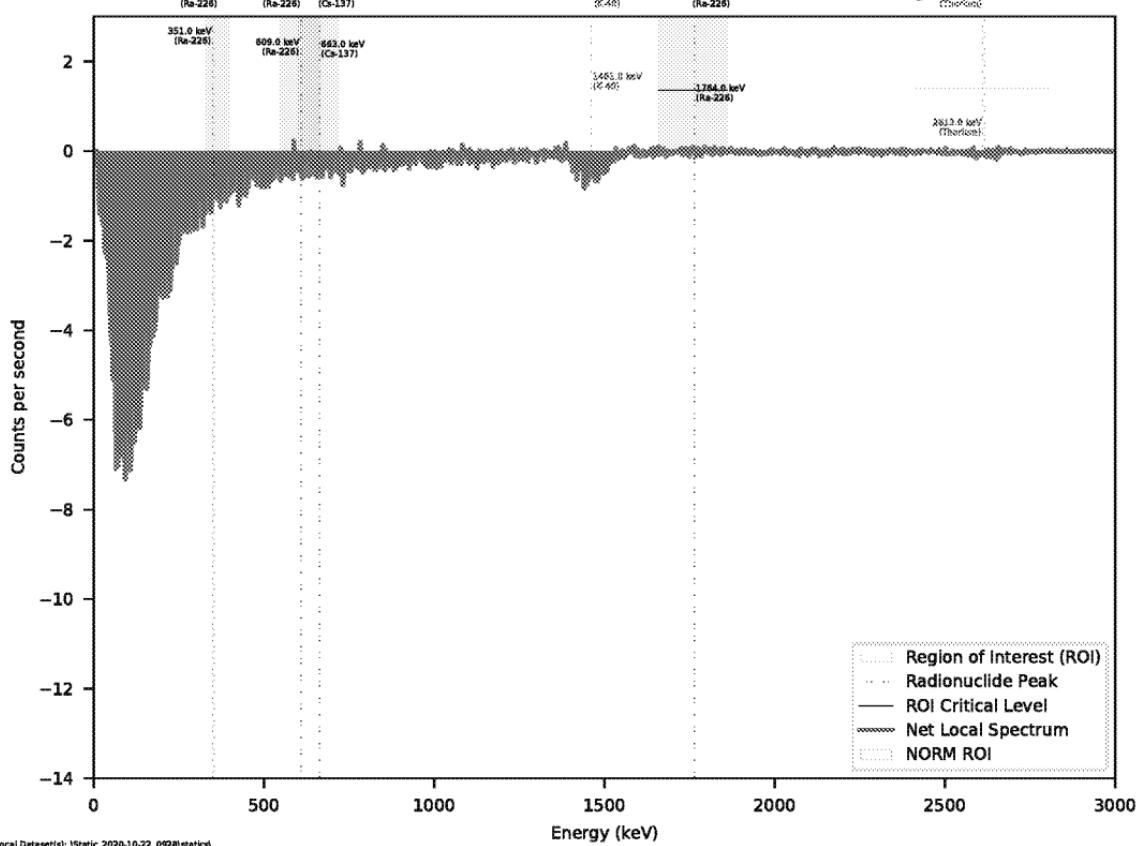
## Net Gamma Spectrum, Static Location: 41

Page 54 of 114



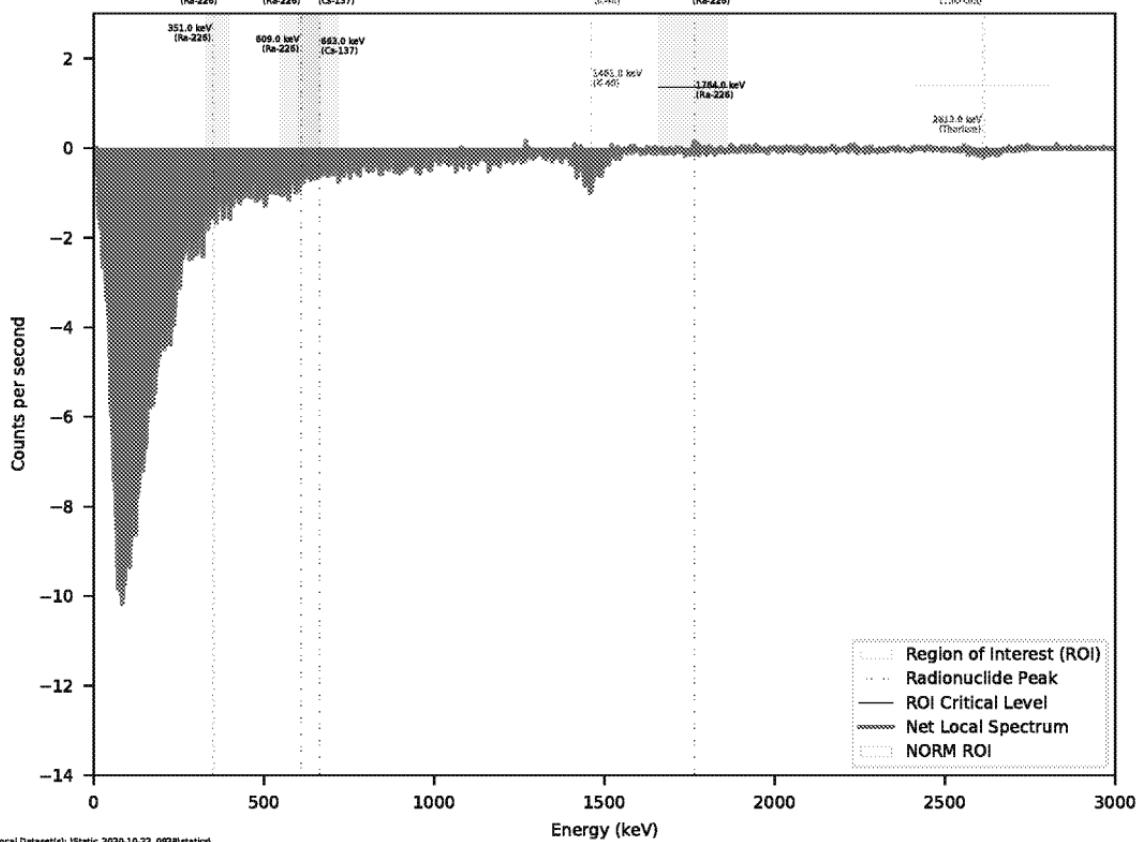
## Net Gamma Spectrum, Static Location: 42

Page 55 of 114



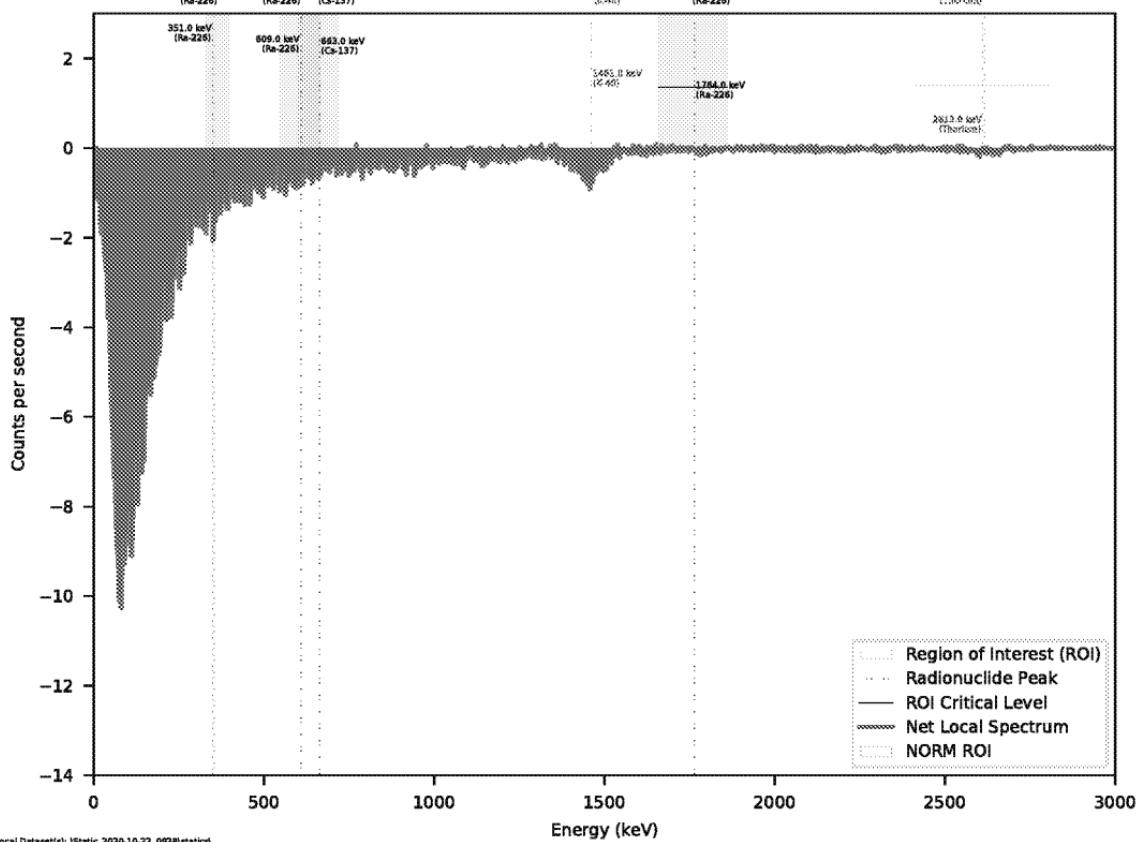
## Net Gamma Spectrum, Static Location: 43

Page 56 of 114



ED\_006360A\_00000350-00056

## Net Gamma Spectrum, Static Location: 44

Page 57 of 114  
of 114

ED\_006360A\_00000350-00057



## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-40091-1  
Laboratory Sample Delivery Group: GJ46599780  
Client Project/Site: HPNS-Parcel G 501197  
Revision: 1

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

*Authorized for release by:*  
4/13/2021 2:20:42 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

#### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Chain of Custody . . . . .	7
Receipt Checklists . . . . .	11
Definitions/Glossary . . . . .	12
Method Summary . . . . .	13
Sample Summary . . . . .	14
Client Sample Results . . . . .	15
QC Sample Results . . . . .	31
QC Association Summary . . . . .	37
Tracer Carrier Summary . . . . .	40

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Job ID: 160-40091-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

Narrative

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-40091-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Additional information requested in case narrative for total strontium

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Job ID: 160-40091-1 (Continued)

### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

#### RECEIPT

The samples were received on 10/26/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.3 C.

#### TOTAL BETA STRONTIUM (GFPC)

Samples HPPG-317364365-SU28A-001 (160-40091-1), HPPG-317364365-SU28A-011 (160-40091-11) and HPPG-317364365-SU28A-021 (160-40091-21) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/27/2020, prepared on 11/06/2020 and analyzed on 11/26/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP: HPPG-317364365-SU28A-001 (160-40091-1), HPPG-317364365-SU28A-011 (160-40091-11) and HPPG-317364365-SU28A-021 (160-40091-21).

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Samples HPPG-317364365-SU28A-001 (160-40091-1), HPPG-317364365-SU28A-011 (160-40091-11) and HPPG-317364365-SU28A-021 (160-40091-21) were analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 10/27/2020, prepared on 12/15/2020 and analyzed on 12/23/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491927/1-A)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Samples HPPG-317364365-SU28A-001 (160-40091-1), HPPG-317364365-SU28A-011 (160-40091-11) and HPPG-317364365-SU28A-021 (160-40091-21) were analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 10/27/2020, prepared on 11/03/2020 and analyzed on 12/03/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-487802/1-A)

Detectors 163-170 were calibrated on 11/6 therefor no monthly calibration verification (ccv) is needed until the the following monthly check which was 12/14 for these detectors.(LCS 160-487802/2-A), (MB 160-487802/1-A), (160-40090-A-1-E) and (160-40090-A-1-F DU)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-317364365-SU28A-001 (160-40091-1), HPPG-317364365-SU28A-002 (160-40091-2), HPPG-317364365-SU28A-003 (160-40091-3), HPPG-317364365-SU28A-004 (160-40091-4), HPPG-317364365-SU28A-005 (160-40091-5), HPPG-317364365-SU28A-006 (160-40091-6), HPPG-317364365-SU28A-007 (160-40091-7), HPPG-317364365-SU28A-008 (160-40091-8), HPPG-317364365-SU28A-009 (160-40091-9), HPPG-317364365-SU28A-010 (160-40091-10), HPPG-317364365-SU28A-011 (160-40091-11), HPPG-317364365-SU28A-012 (160-40091-12), HPPG-317364365-SU28A-013 (160-40091-13), HPPG-317364365-SU28A-014 (160-40091-14), HPPG-317364365-SU28A-015 (160-40091-15), HPPG-317364365-SU28A-016 (160-40091-16), HPPG-317364365-SU28A-017 (160-40091-17), HPPG-317364365-SU28A-018 (160-40091-18), HPPG-317364365-SU28A-019 (160-40091-19), HPPG-317364365-SU28A-020 (160-40091-20), HPPG-317364365-SU28A-021 (160-40091-21), HPPG-317364365-SU28A-022 (160-40091-22), HPPG-317364365-SU28A-023 (160-40091-23), HPPG-317364365-SU28A-024 (160-40091-24), HPPG-317364365-SU28A-025 (160-40091-25), HPPG-F-015 (160-40091-26) and HPPG-F-016 (160-40091-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 10/27/2020 and 10/28/2020, prepared on 11/02/2020, 11/03/2020 and 11/04/2020 and analyzed on 11/25/2020, 11/26/2020 and 12/01/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often,

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

### Job ID: 160-40091-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

#### Gamma prep batch 488229

The radium-226 detection goal of 0.2 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

The radium-226 activity in the sample is below to the DLC and RL. (MB 160-488229/1-A)

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU for Th-234: (160-40093-A-15-C DU). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

The method blank (MB) z-score associated with Prep Batch 160-488229 is within limits and is stored in the level IV raw data. (MB 160-488229/1-A)

#### Gamma prep batch 487748

The method blank (MB) z-score associated with Prep Batch 160-487748 is within limits and is stored in the level IV raw data. (MB 160-487748/1-A)

The replicate precision for Pb-214 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (160-40092-A-11-C DU)

#### Gamma prep batch 487736

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

HPPG-317364365-SU28A-006 (160-40091-6) and HPPG-317364365-SU28A-009 (160-40091-9)

The method blank (MB) z-score associated with Prep Batch 160-487736 is within limits and is stored in the level IV raw data. (MB 160-487736/1-A)

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU for Th-234: HPPG-317364365-SU28A-011

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

### Job ID: 160-40091-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

(160-40091-11). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

Gamma prep batch -488132

The method blank (MB) z-score associated with Prep Batch 160-488132 is within limits and is stored in the level IV raw data. (MB 160-488132/1-A)

The replicate precision for Co-60 associated with Prep Batch 160-487040 and 160-488132 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (160-40091-A-23-C DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-013

Page 1 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago, Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murri

				Collection Information				Analysis Requested					
Sample ID	Date	Time	Method	Matrix	# of Containers	Preservatives (water)	Preservatives (soil)	Container Type	Strontium-89 (EPA 905 M0D)	Isotope Pu (238, 239/240)	Dose Rate uR/Hr	Evidence Bag ID	Comment
HPPG-317364365-SU28A-001	10/21/2020	14:54	G	SO	1	16 oz. plastic jar		X	X	X	X	GJ46599780	
HPPG-317364365-SU28A-002	10/21/2020	14:58	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-003	10/21/2020	15:02	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-004	10/21/2020	15:06	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-005	10/21/2020	15:09	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-006	10/21/2020	15:13	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-007	10/21/2020	15:17	G	SO	1	16 oz. plastic jar		X				GJ46599780	
HPPG-317364365-SU28A-008	10/21/2020	15:22	G	SO	1	16 oz. plastic jar		X				GJ46599780	

## Special Instructions:

21 day ingrowth results only  
Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g

Turnaround Time:	3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:	I <input type="checkbox"/>	II <input type="checkbox"/>	III <input type="checkbox"/>	Project Specific
Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; SO = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening									

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Devin Lewis		10/22/2020 17:43	Locked Storage (RKilpack)		10/22/2020 17:43
Locked Storage (RKilpack)		10/23/2020 17:12	Devin Lewis		10/23/2020 17:12
Devin Lewis		10/23/2020 17:15	SHIPPED TO LAB VIA FE		10/24/2020 08:38

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*





# CHAIN OF CUSTODY

Ref. Document # 501197RSY-013

Page 2 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murn  
Paul LeBlanc

Lab Contact Name/ph #	Collection Information				Preservatives (water)	Analysis Requested				Evidence Bag ID	Comment			
	Sample ID	Date	Time	Method		Preservatives (soil)								
						# of Containers	Preservatives (soil)	Container Type						
	HPPG-317364365-SU28A-009	10/21/2020	15:31	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-010	10/21/2020	15:36	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-011	10/21/2020	15:40	G	SO	1	16 oz. plastic jar	X	X	X	GJ46599780			
	HPPG-317364365-SU28A-012	10/21/2020	15:45	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-013	10/21/2020	15:50	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-014	10/21/2020	15:54	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-015	10/21/2020	15:58	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-016	10/21/2020	16:01	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-017	10/21/2020	16:06	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-018	10/21/2020	16:08	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-019	10/21/2020	16:10	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-020	10/21/2020	16:12	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-021	10/21/2020	16:14	G	SO	1	16 oz. plastic jar	X	X	X	GJ46599780			
	HPPG-317364365-SU28A-022	10/21/2020	16:16	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-023	10/21/2020	16:19	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-024	10/21/2020	16:22	G	SO	1	16 oz. plastic jar	X			GJ46599780			
	HPPG-317364365-SU28A-025	10/21/2020	16:25	G	SO	1	16 oz. plastic jar	X			GJ46599780			



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-013

Page 3 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

Project Manager: Lisa Bercik  
Phone #: (619)213-3389

Send Report to: Rose Condit  
Phone/Fax Number: 415-987-6760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Lewis, Devin

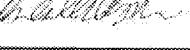
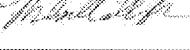
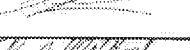
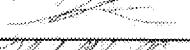
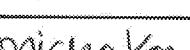
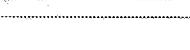
Sample Tech(s): Andrew Murri  
Paul LeBlanc

Collection Information				Analysis Requested				Dose Rate uR/Hr	Evidence Bag ID	Comment
				Sample Spec (EPA 9011-M) - Full 21	Standard-90 (ERFA 905 M0D)	Pres226 by Alpha specs, Isotope U234	Isotope Pu (238, 239/240)			
Sample ID	Date	Time	Method	# of Containers	Matrix	Preservatives (water)	Preservatives (soil)			
HPPG-F-015	10/21/2020	15:22	G	1	SO	16 oz. plastic jar	X		GJ46599780	
HPPG-F-016	10/21/2020	16:08	G	1	SO	16 oz. plastic jar	X		GJ46599780	



# All Transfers for COC 501197RSY-013

Page 4 of 4

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/21/2020 17:26	Locked Storage (RKillpack)		10/21/2020 17:26
Locked Storage (RKillpack)		10/22/2020 15:42	Devin Lewis		10/22/2020 15:42
Devin Lewis		10/22/2020 17:43	Locked Storage (RKillpack)		10/22/2020 17:43
Locked Storage (RKillpack)		10/23/2020 17:12	Devin Lewis		10/23/2020 17:12
Devin Lewis		10/23/2020 17:15	SHIPPEDTOLAB via FE	Michael Jennings	10/26/2020 08:30



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-40091-1

SDG Number: GJ46599780

**Login Number:** 40091

**List Source:** Eurofins TestAmerica, St. Louis

**List Number:** 1

**Creator:** Korrinhizer, Micha L

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

## Protocol References:

DOE = U.S. Department of Energy

None = None

## Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40091-1	HPPG-317364365-SU28A-001	Solid	10/21/20 14:54	10/26/20 08:38	
160-40091-2	HPPG-317364365-SU28A-002	Solid	10/21/20 14:58	10/26/20 08:38	
160-40091-3	HPPG-317364365-SU28A-003	Solid	10/21/20 15:02	10/26/20 08:38	
160-40091-4	HPPG-317364365-SU28A-004	Solid	10/21/20 15:06	10/26/20 08:38	
160-40091-5	HPPG-317364365-SU28A-005	Solid	10/21/20 15:09	10/26/20 08:38	
160-40091-6	HPPG-317364365-SU28A-006	Solid	10/21/20 15:13	10/26/20 08:38	
160-40091-7	HPPG-317364365-SU28A-007	Solid	10/21/20 15:17	10/26/20 08:38	
160-40091-8	HPPG-317364365-SU28A-008	Solid	10/21/20 15:22	10/26/20 08:38	
160-40091-9	HPPG-317364365-SU28A-009	Solid	10/21/20 15:31	10/26/20 08:38	
160-40091-10	HPPG-317364365-SU28A-010	Solid	10/21/20 15:36	10/26/20 08:38	
160-40091-11	HPPG-317364365-SU28A-011	Solid	10/21/20 15:40	10/26/20 08:38	
160-40091-12	HPPG-317364365-SU28A-012	Solid	10/21/20 15:45	10/26/20 08:38	
160-40091-13	HPPG-317364365-SU28A-013	Solid	10/21/20 15:50	10/26/20 08:38	
160-40091-14	HPPG-317364365-SU28A-014	Solid	10/21/20 15:54	10/26/20 08:38	
160-40091-15	HPPG-317364365-SU28A-015	Solid	10/21/20 15:58	10/26/20 08:38	
160-40091-16	HPPG-317364365-SU28A-016	Solid	10/21/20 16:01	10/26/20 08:38	
160-40091-17	HPPG-317364365-SU28A-017	Solid	10/21/20 16:06	10/26/20 08:38	
160-40091-18	HPPG-317364365-SU28A-018	Solid	10/21/20 16:08	10/26/20 08:38	
160-40091-19	HPPG-317364365-SU28A-019	Solid	10/21/20 16:10	10/26/20 08:38	
160-40091-20	HPPG-317364365-SU28A-020	Solid	10/21/20 16:12	10/26/20 08:38	
160-40091-21	HPPG-317364365-SU28A-021	Solid	10/21/20 16:14	10/26/20 08:38	
160-40091-22	HPPG-317364365-SU28A-022	Solid	10/21/20 16:16	10/26/20 08:38	
160-40091-23	HPPG-317364365-SU28A-023	Solid	10/21/20 16:19	10/26/20 08:38	
160-40091-24	HPPG-317364365-SU28A-024	Solid	10/21/20 16:22	10/26/20 08:38	
160-40091-25	HPPG-317364365-SU28A-025	Solid	10/21/20 16:25	10/26/20 08:38	
160-40091-26	HPPG-F-015	Solid	10/21/20 15:22	10/26/20 08:38	
160-40091-27	HPPG-F-016	Solid	10/21/20 16:08	10/26/20 08:38	

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-001**

**Lab Sample ID: 160-40091-1**

Date Collected: 10/21/20 14:54

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0443	U	0.0702	0.0703	0.160	0.0542	pCi/g	11/06/20 11:01	11/26/20 10:44	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>							
Sr Carrier	82.7		40 - 110							
								<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
								11/06/20 11:01	11/26/20 10:44	1

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-238	0.000	U	0.00844	0.00844	0.100	0.00695	pCi/g	12/15/20 12:11	12/23/20 14:28	1
Plutonium-239/240	0.000	U	0.00845	0.00845	0.100	0.00695	pCi/g	12/15/20 12:11	12/23/20 14:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>							
Pu-242 (T)	92.6		30 - 110							
								<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
								12/15/20 12:11	12/23/20 14:28	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-234	0.376		0.0571	0.0652	0.250	0.00505	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-235/236	0.0270		0.0187	0.0189	0.100	0.00628	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-238	0.392		0.0583	0.0670	0.250	0.00504	pCi/g	11/03/20 12:03	12/03/20 16:16	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>							
Uranium-232	82.0		30 - 110							
								<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
								11/03/20 12:03	12/03/20 16:16	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.362	U	0.703	0.704	0.406	0.406	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Actinium 228</b>	<b>0.280</b>		0.145	0.148	0.135	0.135	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Bismuth-212	0.000	U	0.399	0.399	0.591	0.591	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Bismuth-214</b>	<b>0.336</b>		0.106	0.111	0.0456	0.0456	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Cesium-137	-0.000467	U	0.0745	0.0745	0.0700	0.0613	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Lead-210	0.590	U	1.31	1.32	1.05	1.05	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Lead-212</b>	<b>0.439</b>		0.0888	0.105	0.0405	0.0405	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Lead-214</b>	<b>0.477</b>		0.104	0.115	0.0481	0.0481	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Potassium-40</b>	<b>9.29</b>		1.39	1.68	0.313	0.313	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Protactinium-231	0.000	U	0.377	0.377	2.16	2.16	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Protactinium-234	0.0880	U	0.182	0.183	0.170	0.170	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Radium-226</b>	<b>0.336</b>		0.106	0.111	0.0456	0.0456	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Radium-228</b>	<b>0.280</b>		0.145	0.148	0.135	0.135	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Thallium-208</b>	<b>0.168</b>		0.0492	0.0523	0.0140	0.0140	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Thorium-232</b>	<b>0.280</b>		0.145	0.148	0.135	0.135	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Thorium-234	-0.0189	U	0.508	0.508	1.05	1.05	pCi/g	11/02/20 15:15	11/26/20 13:52	1
<b>Thorium 228</b>	<b>0.439</b>		0.0888	0.105	0.0405	0.0405	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Uranium-235	0.175	U	0.368	0.368	0.343	0.343	pCi/g	11/02/20 15:15	11/26/20 13:52	1
Uranium-238	-0.0189	U	0.508	0.508	1.05	1.05	pCi/g	11/02/20 15:15	11/26/20 13:52	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-002**

**Lab Sample ID: 160-40091-2**

Date Collected: 10/21/20 14:58  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.228	U	0.752	0.753		0.460	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Actinium 228	0.0440	U	0.357	0.357		0.187	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Bismuth-212	-0.319	U	0.845	0.846		0.666	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Bismuth-214</b>	<b>0.439</b>		0.123	0.131		0.0507	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Cesium-137	-0.0459	U	0.0803	0.0804	0.0700	0.0623	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Lead-210</b>	<b>1.18</b>		1.54	1.55		1.06	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Lead-212</b>	<b>0.387</b>		0.0957	0.104		0.0490	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Lead-214</b>	<b>0.479</b>		0.136	0.145		0.0597	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Potassium-40</b>	<b>9.26</b>		1.45	1.73		0.132	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Protactinium-231	0.565	U	1.79	1.79		1.97	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Protactinium-234	-0.108	U	0.325	0.325		0.264	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Radium-226</b>	<b>0.439</b>		0.123	0.131	0.200	0.0507	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Radium-228	0.0440	U	0.357	0.357		0.187	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Thallium-208</b>	<b>0.129</b>		0.0859	0.0869		0.0395	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Thorium-232	0.0440	U	0.357	0.357		0.187	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Thorium-234</b>	<b>0.593</b>		0.595	0.599		0.474	pCi/g	11/02/20 15:15	11/26/20 13:54	1
<b>Thorium 228</b>	<b>0.387</b>		0.0957	0.104		0.0490	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Uranium-235	0.00470	U	0.00956	0.00957		0.517	pCi/g	11/02/20 15:15	11/26/20 13:54	1
Uranium-238	0.593		0.595	0.599		0.474	pCi/g	11/02/20 15:15	11/26/20 13:54	1

**Client Sample ID: HPPG-317364365-SU28A-003**

**Lab Sample ID: 160-40091-3**

Date Collected: 10/21/20 15:02  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0808	U	0.292	0.292		0.314	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Actinium 228</b>	<b>0.271</b>		0.194	0.196		0.0875	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Bismuth-212	0.306	U	0.483	0.484		0.364	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Bismuth-214</b>	<b>0.179</b>		0.0732	0.0755		0.114	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Cesium-137	0.0244	U	0.0416	0.0417	0.0700	0.0317	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Lead-210	0.0363	U	1.25	1.25		1.02	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Lead-212</b>	<b>0.383</b>		0.0741	0.0892		0.0344	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Lead-214</b>	<b>0.345</b>		0.0900	0.0969		0.0371	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Potassium-40</b>	<b>8.72</b>		1.16	1.46		0.0892	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Protactinium-231	0.626	U	1.50	1.50		1.67	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Protactinium-234	0.0778	U	0.180	0.181		0.152	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Radium-226</b>	<b>0.179</b>		0.0732	0.0755	0.200	0.114	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Radium-228	0.271		0.194	0.196		0.0875	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Thallium-208</b>	<b>0.136</b>		0.0779	0.0792		0.0338	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Thorium-232</b>	<b>0.271</b>		0.194	0.196		0.0875	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Thorium-234	0.000	U	0.299	0.299		0.808	pCi/g	11/02/20 15:15	11/26/20 13:56	1
<b>Thorium 228</b>	<b>0.383</b>		0.0741	0.0892		0.0344	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Uranium-235	0.0916	U	0.268	0.268		0.254	pCi/g	11/02/20 15:15	11/26/20 13:56	1
Uranium-238	0.000	U	0.299	0.299		0.808	pCi/g	11/02/20 15:15	11/26/20 13:56	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-004**

**Lab Sample ID: 160-40091-4**

Date Collected: 10/21/20 15:06  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.123	U	0.368	0.368		0.438	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Actinium 228	-0.139	U	0.0989	0.0999		0.254	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Bismuth-212	-0.509	U	1.05	1.05		0.818	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Bismuth-214</b>	<b>0.380</b>		0.162	0.167		0.0630	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Cesium-137	0.00474	U	0.0663	0.0663	0.0700	0.0541	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Lead-210	-0.160	U	1.72	1.72		1.41	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Lead-212</b>	<b>0.436</b>		0.142	0.153		0.0656	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Lead-214</b>	<b>0.267</b>		0.175	0.177		0.127	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Potassium-40</b>	<b>8.02</b>		1.55	1.75		0.175	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Protactinium-231	0.244	U	1.58	1.58		2.44	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Protactinium-234	0.147	U	0.138	0.139		0.291	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Radium-226</b>	<b>0.380</b>		0.162	0.167	0.200	0.0630	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Radium-228	-0.139	U	0.0989	0.0999		0.254	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Thallium-208</b>	<b>0.162</b>		0.117	0.118		0.0608	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Thorium-232	-0.139	U	0.0989	0.0999		0.254	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Thorium-234	-0.155	U	1.13	1.13		0.933	pCi/g	11/02/20 15:15	11/26/20 13:55	1
<b>Thorium 228</b>	<b>0.436</b>		0.142	0.153		0.0656	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Uranium-235	0.102	U	0.252	0.252		0.522	pCi/g	11/02/20 15:15	11/26/20 13:55	1
Uranium-238	-0.155	U	1.13	1.13		0.933	pCi/g	11/02/20 15:15	11/26/20 13:55	1

**Client Sample ID: HPPG-317364365-SU28A-005**

**Lab Sample ID: 160-40091-5**

Date Collected: 10/21/20 15:09  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0497	U	0.226	0.226		0.332	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Actinium 228</b>	<b>0.245</b>		0.111	0.113		0.112	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Bismuth-212	-0.257	U	0.819	0.820		0.653	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Bismuth-214</b>	<b>0.357</b>		0.130	0.136		0.0570	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Cesium-137	-0.0284	U	0.0795	0.0795	0.0700	0.0634	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Lead-210	0.705	U	1.21	1.21		0.828	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Lead-212</b>	<b>0.252</b>		0.0735	0.0804		0.0372	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Lead-214</b>	<b>0.275</b>		0.0905	0.0949		0.0492	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Potassium-40</b>	<b>7.20</b>		1.26	1.46		0.303	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Protactinium-231	0.612	U	1.91	1.91		2.08	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Protactinium-234	0.0614	U	0.298	0.298		0.244	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Radium-226</b>	<b>0.357</b>		0.130	0.136	0.200	0.0570	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Radium-228	<b>0.245</b>		0.111	0.113		0.112	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Thallium-208</b>	<b>0.140</b>		0.0636	0.0653		0.0282	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Thorium-232	<b>0.245</b>		0.111	0.113		0.112	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Thorium-234	<b>0.675</b>		0.576	0.581		0.382	pCi/g	11/02/20 15:15	11/26/20 13:57	1
<b>Thorium 228</b>	<b>0.252</b>		0.0735	0.0804		0.0372	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Uranium-235	-0.184	U	0.610	0.610		0.498	pCi/g	11/02/20 15:15	11/26/20 13:57	1
Uranium-238	<b>0.675</b>		0.576	0.581		0.382	pCi/g	11/02/20 15:15	11/26/20 13:57	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-006**

**Lab Sample ID: 160-40091-6**

Date Collected: 10/21/20 15:13  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.224	U	0.434	0.435		0.351	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Actinium 228</b>	<b>0.448</b>		0.205	0.211		0.112	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Bismuth-212	-0.0182	U	1.05	1.05		0.866	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Bismuth-214</b>	<b>0.373</b>		0.150	0.156		0.0567	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Cesium-137	0.0306	U	0.104	0.104	0.0700	0.0833	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Lead-210	1.11	U	2.01	2.01		1.59	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Lead-212</b>	<b>0.343</b>		0.107	0.114		0.0626	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Lead-214</b>	<b>0.490</b>		0.149	0.159		0.0696	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Potassium-40</b>	<b>9.29</b>		1.61	1.93		0.321	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Protactinium-231	-1.09	U	3.58	3.58		2.91	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Protactinium-234	-0.133	U	0.410	0.410		0.334	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Radium-226</b>	<b>0.373</b>		0.150	0.156	0.200	0.0567	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Radium-228</b>	<b>0.448</b>		0.205	0.211		0.112	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Thallium-208</b>	<b>0.105</b>		0.104	0.105		0.0559	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Thorium-232</b>	<b>0.448</b>		0.205	0.211		0.112	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Thorium-234	-0.600	U	1.04	1.04		0.956	pCi/g	11/02/20 15:15	11/26/20 13:58	1
<b>Thorium 228</b>	<b>0.343</b>		0.107	0.114		0.0626	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Uranium-235	0.0451	U	0.0989	0.0990		0.258	pCi/g	11/02/20 15:15	11/26/20 13:58	1
Uranium-238	-0.600	U	1.04	1.04		0.956	pCi/g	11/02/20 15:15	11/26/20 13:58	1

**Client Sample ID: HPPG-317364365-SU28A-007**

**Lab Sample ID: 160-40091-7**

Date Collected: 10/21/20 15:17  
 Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.296	U	0.605	0.606		0.358	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Actinium 228</b>	<b>0.378</b>		0.195	0.199		0.281	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Bismuth-212	-0.0131	U	1.10	1.10		0.908	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Bismuth-214</b>	<b>0.666</b>		0.173	0.186		0.0432	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Cesium-137	0.0361	U	0.0790	0.0791	0.0700	0.0604	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Lead-210	1.18	U	2.04	2.05		1.39	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Lead-212</b>	<b>0.592</b>		0.127	0.141		0.0596	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Lead-214</b>	<b>0.521</b>		0.136	0.146		0.0820	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Potassium-40</b>	<b>9.81</b>		1.96	2.20		0.329	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Protactinium-231	0.435	U	1.85	1.85		2.90	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Protactinium-234	0.103	U	0.356	0.356		0.289	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Radium-226</b>	<b>0.666</b>		0.173	0.186	0.200	0.0432	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Radium-228</b>	<b>0.378</b>		0.195	0.199		0.281	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Thallium-208</b>	<b>0.140</b>		0.136	0.136		0.0645	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Thorium-232</b>	<b>0.378</b>		0.195	0.199		0.281	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Thorium-234	1.33		0.838	0.851		0.527	pCi/g	11/02/20 15:15	11/26/20 14:35	1
<b>Thorium 228</b>	<b>0.592</b>		0.127	0.141		0.0596	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Uranium-235	0.0559	U	0.173	0.173		0.508	pCi/g	11/02/20 15:15	11/26/20 14:35	1
Uranium-238	1.33		0.838	0.851		0.527	pCi/g	11/02/20 15:15	11/26/20 14:35	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-008**

**Lab Sample ID: 160-40091-8**

Date Collected: 10/21/20 15:22

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.118	U	0.517	0.517		0.315	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Actinium 228</b>	<b>0.503</b>		0.222	0.228		0.0784	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Bismuth-212	-0.0448	U	0.879	0.879		0.720	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Bismuth-214	0.0994	U	0.201	0.201		0.155	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Cesium-137	0.0189	U	0.0357	0.0357	0.0700	0.0259	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Lead-210</b>	<b>1.25</b>		1.63	1.64		1.08	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Lead-212</b>	<b>0.484</b>		0.105	0.122		0.0511	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Lead-214</b>	<b>0.564</b>		0.156	0.166		0.0648	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Potassium-40</b>	<b>7.96</b>		1.40	1.62		0.339	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Protactinium-231	0.000	U	0.852	0.852		2.33	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Protactinium-234	0.0470	U	0.0687	0.0688		0.211	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Radium-226	0.0994	U	0.201	0.201	0.200	0.155	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Radium-228</b>	<b>0.503</b>		0.222	0.228		0.0784	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Thallium-208</b>	<b>0.140</b>		0.0602	0.0619		0.0281	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Thorium-232</b>	<b>0.503</b>		0.222	0.228		0.0784	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Thorium-234	-0.167	U	0.692	0.692		0.477	pCi/g	11/02/20 15:15	11/26/20 14:39	1
<b>Thorium 228</b>	<b>0.484</b>		0.105	0.122		0.0511	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Uranium-235	0.0728	U	0.0786	0.0790		0.388	pCi/g	11/02/20 15:15	11/26/20 14:39	1
Uranium-238	-0.167	U	0.692	0.692		0.477	pCi/g	11/02/20 15:15	11/26/20 14:39	1

**Client Sample ID: HPPG-317364365-SU28A-009**

**Lab Sample ID: 160-40091-9**

Date Collected: 10/21/20 15:31

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.226	U	0.498	0.498		0.291	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Actinium 228	0.191	U	0.318	0.319		0.201	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Bismuth-212	-0.0721	U	1.14	1.14		0.935	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Bismuth-214</b>	<b>0.202</b>		0.141	0.142		0.188	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Cesium-137	-0.0958	U	0.139	0.139	0.0700	0.0962	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Lead-210	0.831	U	1.65	1.66		1.13	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Lead-212</b>	<b>0.491</b>		0.116	0.132		0.0492	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Lead-214</b>	<b>0.369</b>		0.145	0.150		0.0679	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Potassium-40</b>	<b>8.36</b>		1.81	2.00		0.357	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Protactinium-231	0.0000000	U	3.39	3.39		2.79	pCi/g	11/02/20 15:15	11/26/20 14:37	1
			434							
Protactinium-234	0.0527	U	0.0893	0.0895		0.229	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Radium-226</b>	<b>0.202</b>		0.141	0.142	0.200	0.188	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Radium-228	0.191	U	0.318	0.319		0.201	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Thallium-208</b>	<b>0.285</b>		0.0801	0.0854		0.0125	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Thorium-232	0.191	U	0.318	0.319		0.201	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Thorium-234</b>	<b>0.689</b>		0.567	0.572		0.435	pCi/g	11/02/20 15:15	11/26/20 14:37	1
<b>Thorium 228</b>	<b>0.491</b>		0.116	0.132		0.0492	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Uranium-235	0.123	U	0.372	0.372		0.299	pCi/g	11/02/20 15:15	11/26/20 14:37	1
Uranium-238	0.689		0.567	0.572		0.435	pCi/g	11/02/20 15:15	11/26/20 14:37	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-010**

**Lab Sample ID: 160-40091-10**

Date Collected: 10/21/20 15:36

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.290	U	0.563	0.564		0.325	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Actinium 228	0.116	U	0.192	0.192		0.117	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Bismuth-212	0.000	U	0.229	0.229		0.461	pCi/g	11/02/20 15:15	11/26/20 14:40	1
<b>Bismuth-214</b>	<b>0.292</b>		0.0978	0.102		0.0427	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Cesium-137	-0.00897	U	0.0624	0.0624	0.0700	0.0508	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Lead-210	-0.603	U	1.14	1.15		0.911	pCi/g	11/02/20 15:15	11/26/20 14:40	1
<b>Lead-212</b>	<b>0.307</b>		0.0671	0.0780		0.0320	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Lead-214	0.241		0.0835	0.0872		0.0371	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Potassium-40	8.00		1.14	1.40		0.245	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Protactinium-231	0.481	U	1.42	1.43		1.56	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Protactinium-234	0.0166	U	0.197	0.197		0.161	pCi/g	11/02/20 15:15	11/26/20 14:40	1
<b>Radium-226</b>	<b>0.292</b>		0.0978	0.102	0.200	0.0427	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Radium-228	0.116	U	0.192	0.192		0.117	pCi/g	11/02/20 15:15	11/26/20 14:40	1
<b>Thallium-208</b>	<b>0.0807</b>		0.0340	0.0351		0.0122	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Thorium-232	0.116	U	0.192	0.192		0.117	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Thorium-234	0.158	U	0.337	0.338		0.692	pCi/g	11/02/20 15:15	11/26/20 14:40	1
<b>Thorium 228</b>	<b>0.307</b>		0.0671	0.0780		0.0320	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Uranium-235	-0.00694	U	0.0115	0.0115		0.300	pCi/g	11/02/20 15:15	11/26/20 14:40	1
Uranium-238	0.158	U	0.337	0.338		0.692	pCi/g	11/02/20 15:15	11/26/20 14:40	1

**Client Sample ID: HPPG-317364365-SU28A-011**

**Lab Sample ID: 160-40091-11**

Date Collected: 10/21/20 15:40

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.0184	U	0.0547	0.0547	0.160	0.0467	pCi/g	11/06/20 11:01	11/26/20 10:44	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	90.2		40 - 110					11/06/20 11:01	11/26/20 10:44	1

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Plutonium-238	-0.00636	U	0.00948	0.00949	0.100	0.00986	pCi/g	12/15/20 12:11	12/23/20 14:28	1
Plutonium-239/240	0.000	U	0.0104	0.0104	0.100	0.00855	pCi/g	12/15/20 12:11	12/23/20 14:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Pu-242 (T)	93.2		30 - 110					12/15/20 12:11	12/23/20 14:28	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-234	0.319		0.0546	0.0608	0.250	0.0103	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-235/236	0.0110		0.0135	0.0135	0.100	0.00641	pCi/g	11/03/20 12:03	12/03/20 16:16	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-011**

**Lab Sample ID: 160-40091-11**

Date Collected: 10/21/20 15:40

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-238	0.367		0.0587	0.0663	0.250	0.0115	pCi/g	11/03/20 12:03	12/03/20 16:16	1
<i>Tracer</i>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	77.1		30 - 110					11/03/20 12:03	12/03/20 16:16	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.108	U	0.399	0.399		0.363	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Actinium 228</b>	<b>0.270</b>		0.239	0.240		0.126	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Bismuth-212	-0.335	U	0.797	0.798		0.624	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Bismuth-214</b>	<b>0.276</b>		0.115	0.118		0.0556	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Cesium-137	0.000	U	0.0441	0.0441	0.0700	0.0598	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Lead-210	-1.00	U	1.78	1.78		1.51	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Lead-212</b>	<b>0.376</b>		0.0887	0.0970		0.0424	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Lead-214</b>	<b>0.317</b>		0.103	0.108		0.0685	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Potassium-40</b>	<b>9.45</b>		1.43	1.72		0.127	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Protactinium-231	0.000	U	0.842	0.842		2.30	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Protactinium-234	0.0983	U	0.261	0.261		0.219	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Radium-226</b>	<b>0.276</b>		0.115	0.118	0.200	0.0556	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Radium-228</b>	<b>0.270</b>		0.239	0.240		0.126	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Thallium-208</b>	<b>0.134</b>		0.0732	0.0745		0.0337	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Thorium-232</b>	<b>0.270</b>		0.239	0.240		0.126	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Thorium-234	-1.00	U	0.612	0.622		0.924	pCi/g	11/02/20 15:15	11/26/20 14:41	1
<b>Thorium 228</b>	<b>0.376</b>		0.0887	0.0970		0.0424	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Uranium-235	-0.110	U	0.499	0.500		0.408	pCi/g	11/02/20 15:15	11/26/20 14:41	1
Uranium-238	-1.00	U	0.612	0.622		0.924	pCi/g	11/02/20 15:15	11/26/20 14:41	1

**Client Sample ID: HPPG-317364365-SU28A-012**

**Lab Sample ID: 160-40091-12**

Date Collected: 10/21/20 15:45

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0888	U	0.468	0.468		0.274	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Actinium 228</b>	<b>0.444</b>		0.139	0.146		0.0252	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Bismuth-212	-0.467	U	0.721	0.722		0.555	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Bismuth-214</b>	<b>0.235</b>		0.0905	0.0937		0.137	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Cesium-137	0.00289	U	0.0463	0.0463	0.0700	0.0379	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Lead-210	0.203	U	1.40	1.40		1.14	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Lead-212</b>	<b>0.382</b>		0.0782	0.0925		0.0363	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Lead-214</b>	<b>0.465</b>		0.0991	0.110		0.0503	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Potassium-40</b>	<b>8.34</b>		1.19	1.47		0.0996	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Protactinium-231	0.000	U	0.388	0.388		1.87	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Protactinium-234	0.0807	U	0.264	0.264		0.215	pCi/g	11/02/20 15:15	11/26/20 14:42	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-012**

Date Collected: 10/21/20 15:45  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-12**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Radium-226	0.235		0.0905	0.0937	0.200	0.137	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Radium-228	0.444		0.139	0.146		0.0252	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Thallium-208	0.228		0.0661	0.0702		0.0202	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Thorium-232	0.444		0.139	0.146		0.0252	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Thorium-234	-0.378	U		1.28	1.28	1.05	pCi/g	11/02/20 15:15	11/26/20 14:42	1
<b>Thorium 228</b>	<b>0.382</b>		0.0782	0.0925		0.0363	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Uranium-235	0.0891	U	0.177	0.177		0.372	pCi/g	11/02/20 15:15	11/26/20 14:42	1
Uranium-238	-0.378	U		1.28	1.28	1.05	pCi/g	11/02/20 15:15	11/26/20 14:42	1

**Client Sample ID: HPPG-317364365-SU28A-013**

Date Collected: 10/21/20 15:50  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-13**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.0784	U	0.478	0.478		0.295	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Actinium 228	0.0965	U	0.189	0.189		0.129	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Bismuth-212	-0.241	U	0.776	0.776		0.620	pCi/g	11/02/20 17:57	11/26/20 10:15	1
<b>Bismuth-214</b>	<b>0.274</b>		0.0893	0.0937		0.0365	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Cesium-137	0.0207	U	0.0609	0.0610	0.0700	0.0484	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Lead-210	0.922		1.17	1.17		0.762	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Lead-212	0.200		0.0655	0.0704		0.0360	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Lead-214	0.207		0.0813	0.0841		0.0387	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Potassium-40	6.99		1.17	1.37		0.269	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Protactinium-231	0.594	U	1.87	1.87		1.52	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Protactinium-234	0.0116	U	0.0228	0.0228		0.212	pCi/g	11/02/20 17:57	11/26/20 10:15	1
<b>Radium-226</b>	<b>0.274</b>		0.0893	0.0937	0.200	0.0365	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Radium-228	0.0965	U	0.189	0.189		0.129	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Thallium-208	0.0613		0.0620	0.0624		0.0272	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Thorium-232	0.0965	U	0.189	0.189		0.129	pCi/g	11/02/20 17:57	11/26/20 10:15	1
<b>Thorium-234</b>	<b>0.558</b>		0.526	0.529		0.353	pCi/g	11/02/20 17:57	11/26/20 10:15	1
<b>Thorium 228</b>	<b>0.200</b>		0.0655	0.0704		0.0360	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Uranium-235	0.129	U	0.406	0.406		0.330	pCi/g	11/02/20 17:57	11/26/20 10:15	1
Uranium-238	0.558		0.526	0.529		0.353	pCi/g	11/02/20 17:57	11/26/20 10:15	1

**Client Sample ID: HPPG-317364365-SU28A-014**

Date Collected: 10/21/20 15:54  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-14**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.129	U	0.285	0.285		0.243	pCi/g	11/02/20 17:57	11/26/20 10:59	1
<b>Actinium 228</b>	<b>0.376</b>		0.208	0.211		0.0777	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Bismuth-212	-0.359	U	0.819	0.820		0.638	pCi/g	11/02/20 17:57	11/26/20 10:59	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-014**

Date Collected: 10/21/20 15:54  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-14**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.390		0.110	0.117		0.0293	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Cesium-137	-0.0442	U	0.0328	0.0331	0.0700	0.0627	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Lead-210	-0.769	U	1.54	1.54		1.30	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Lead-212	0.0112	U	0.0947	0.0947		0.0772	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Lead-214	0.211		0.0794	0.0823		0.0366	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Potassium-40	6.91		1.35	1.52		0.223	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Protactinium-231	-0.814	U	2.85	2.85		2.32	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Protactinium-234	0.0456	U	0.121	0.121		0.186	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Radium-226	0.390		0.110	0.117	0.200	0.0293	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Radium-228	0.376		0.208	0.211		0.0777	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Thallium-208	0.0378	U	0.0917	0.0917		0.0438	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Thorium-232	0.376		0.208	0.211		0.0777	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Thorium-234	-0.308	U	0.697	0.698		0.584	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Thorium 228	0.0112	U	0.0947	0.0947		0.0772	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Uranium-235	0.0322	U	0.0838	0.0839		0.312	pCi/g	11/02/20 17:57	11/26/20 10:59	1
Uranium-238	-0.308	U	0.697	0.698		0.584	pCi/g	11/02/20 17:57	11/26/20 10:59	1

**Client Sample ID: HPPG-317364365-SU28A-015**

Date Collected: 10/21/20 15:58  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-15**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.199	U	0.453	0.454		0.272	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Actinium 228</b>	<b>0.330</b>		0.127	0.131		0.0271	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Bismuth-212	0.226	U	0.657	0.657		0.519	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Bismuth-214	0.0648	U	0.171	0.171		0.128	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Cesium-137	0.0219	U	0.0417	0.0418	0.0700	0.0316	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Lead-210	-1.64	U	1.26	1.27		1.36	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Lead-212</b>	<b>0.343</b>		0.0841	0.0951		0.0447	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Lead-214</b>	<b>0.258</b>		0.0923	0.0961		0.0897	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Potassium-40</b>	<b>7.24</b>		1.20	1.41		0.277	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Protactinium-231	0.000	U	0.332	0.332		1.92	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Protactinium-234	0.0681	U	0.170	0.170		0.136	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Radium-226	0.0648	U	0.171	0.171	0.200	0.128	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Radium-228</b>	<b>0.330</b>		0.127	0.131		0.0271	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Thallium-208	0.141		0.0457	0.0480		0.0171	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Thorium-232</b>	<b>0.330</b>		0.127	0.131		0.0271	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Thorium-234	-0.495	U	0.521	0.524		0.483	pCi/g	11/02/20 17:57	11/26/20 11:07	1
<b>Thorium 228</b>	<b>0.343</b>		0.0841	0.0951		0.0447	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Uranium-235	0.106	U	0.255	0.255		0.205	pCi/g	11/02/20 17:57	11/26/20 11:07	1
Uranium-238	-0.495	U	0.521	0.524		0.483	pCi/g	11/02/20 17:57	11/26/20 11:07	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-016**

**Lab Sample ID: 160-40091-16**

Date Collected: 10/21/20 16:01

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.419		0.447	0.450		0.369	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Actinium 228	0.277		0.214	0.216		0.107	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Bismuth-212	-0.214 U		1.02	1.02		0.816	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Bismuth-214	0.132 U		0.122	0.123		0.189	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Cesium-137	-0.0909 U		0.138	0.139	0.0700	0.0946	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Lead-210	0.824		1.09	1.09		0.740	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Lead-212	0.455		0.108	0.123		0.0488	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Lead-214	0.338		0.134	0.138		0.0776	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Potassium-40	7.34		1.60	1.77		0.320	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Protactinium-231	-0.934 U		3.13	3.13		2.54	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Protactinium-234	0.0317 U		0.0665	0.0666		0.189	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Radium-226	0.132 U		0.122	0.123	0.200	0.189	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Radium-228	0.277		0.214	0.216		0.107	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Thallium-208	0.191		0.0721	0.0748		0.0211	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Thorium-232	0.277		0.214	0.216		0.107	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Thorium-234	0.713		0.663	0.668		0.389	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Thorium 228	0.455		0.108	0.123		0.0488	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Uranium-235	-0.107 U		0.127	0.128		0.296	pCi/g	11/02/20 17:57	11/26/20 11:00	1
Uranium-238	0.713		0.663	0.668		0.389	pCi/g	11/02/20 17:57	11/26/20 11:00	1

**Client Sample ID: HPPG-317364365-SU28A-017**

**Lab Sample ID: 160-40091-17**

Date Collected: 10/21/20 16:06

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0114 U		0.0346	0.0346		0.410	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Actinium 228	0.568		0.183	0.192		0.0524	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Bismuth-212	0.000 U		0.334	0.334		0.600	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Bismuth-214	0.429		0.130	0.137		0.0528	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Cesium-137	0.00115 U		0.0559	0.0559	0.0700	0.0459	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Lead-210	0.655 U		1.52	1.52		1.22	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Lead-212	0.447		0.0913	0.108		0.0403	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Lead-214	0.432		0.108	0.116		0.0501	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Potassium-40	8.44		1.38	1.63		0.334	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Protactinium-231	0.000 U		0.232	0.232		2.19	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Protactinium-234	0.0926 U		0.258	0.258		0.227	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Radium-226	0.429		0.130	0.137	0.200	0.0528	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Radium-228	0.568		0.183	0.192		0.0524	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Thallium-208	0.163		0.0514	0.0541		0.0156	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Thorium-232	0.568		0.183	0.192		0.0524	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Thorium-234	0.365 U		0.585	0.586		0.412	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Thorium 228	0.447		0.0913	0.108		0.0403	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Uranium-235	0.152 U		0.276	0.276		0.210	pCi/g	11/02/20 17:57	11/26/20 11:03	1
Uranium-238	0.365 U		0.585	0.586		0.412	pCi/g	11/02/20 17:57	11/26/20 11:03	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-018**

**Lab Sample ID: 160-40091-18**

Date Collected: 10/21/20 16:08

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0835	U	0.617	0.617		0.380	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Actinium 228</b>	<b>0.521</b>		0.171	0.179		0.0329	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Bismuth-212	-0.0922	U	0.940	0.940		0.767	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Bismuth-214</b>	<b>0.412</b>		0.142	0.148		0.0585	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Cesium-137	-0.0318	U	0.0880	0.0880	0.0700	0.0702	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Lead-210	0.816	U	1.65	1.66		1.09	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Lead-212</b>	<b>0.386</b>		0.0901	0.0987		0.0430	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Lead-214</b>	<b>0.394</b>		0.101	0.109		0.0610	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Potassium-40</b>	<b>8.87</b>		1.39	1.66		0.128	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Protactinium-231	-0.878	U	3.00	3.00		2.44	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Protactinium-234	-0.0124	U	0.0250	0.0251		0.284	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Radium-226</b>	<b>0.412</b>		0.142	0.148	0.200	0.0585	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Radium-228</b>	<b>0.521</b>		0.171	0.179		0.0329	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Thallium-208</b>	<b>0.207</b>		0.0539	0.0578		0.00817	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Thorium-232</b>	<b>0.521</b>		0.171	0.179		0.0329	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Thorium-234</b>	<b>0.676</b>		0.588	0.593		0.478	pCi/g	11/02/20 17:57	11/26/20 11:04	1
<b>Thorium 228</b>	<b>0.386</b>		0.0901	0.0987		0.0430	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Uranium-235	0.251	U	0.362	0.363		0.472	pCi/g	11/02/20 17:57	11/26/20 11:04	1
Uranium-238	0.676		0.588	0.593		0.478	pCi/g	11/02/20 17:57	11/26/20 11:04	1

**Client Sample ID: HPPG-317364365-SU28A-019**

**Lab Sample ID: 160-40091-19**

Date Collected: 10/21/20 16:10

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0438	U	0.131	0.131		0.267	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Actinium 228</b>	<b>0.349</b>		0.178	0.182		0.0714	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Bismuth-212	0.250	U	0.457	0.458		0.347	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Bismuth-214</b>	<b>0.306</b>		0.106	0.110		0.0481	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Cesium-137	0.0244	U	0.0480	0.0480	0.0700	0.0373	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Lead-210	0.363	U	0.984	0.985		0.788	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Lead-212</b>	<b>0.389</b>		0.0649	0.0822		0.0166	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Lead-214</b>	<b>0.356</b>		0.0864	0.0940		0.0539	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Potassium-40</b>	<b>7.69</b>		1.09	1.34		0.0892	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Protactinium-231	0.665		0.639	0.643		0.345	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Protactinium-234	0.0848	U	0.205	0.205		0.166	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Radium-226</b>	<b>0.306</b>		0.106	0.110	0.200	0.0481	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Radium-228</b>	<b>0.349</b>		0.178	0.182		0.0714	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thallium-208</b>	<b>0.142</b>		0.0367	0.0396		0.00552	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thorium-232</b>	<b>0.349</b>		0.178	0.182		0.0714	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Thorium-234	-0.301	U	0.970	0.971		0.792	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thorium 228</b>	<b>0.389</b>		0.0649	0.0822		0.0166	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Uranium-235	-0.149	U	0.419	0.419		0.341	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Uranium-238	-0.301	U	0.970	0.971		0.792	pCi/g	11/02/20 17:57	11/26/20 11:09	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-020**

**Lab Sample ID: 160-40091-20**

Date Collected: 10/21/20 16:12

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.419	U	0.592	0.595		0.439	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Actinium 228</b>	<b>0.267</b>		0.129	0.132		0.0339	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Bismuth-212	-0.637	U	0.979	0.981		0.756	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Bismuth-214</b>	<b>0.302</b>		0.116	0.120		0.0495	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Cesium-137	-0.0548	U	0.0881	0.0883	0.0700	0.0686	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Lead-210	-0.147	U		1.34		1.10	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Lead-212</b>	<b>0.254</b>		0.0906	0.0963		0.0568	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Lead-214</b>	<b>0.317</b>		0.101	0.107		0.0524	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Potassium-40</b>	<b>7.70</b>		1.36	1.57		0.139	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Protactinium-231	0.327	U		1.33		2.07	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Protactinium-234	-0.0299	U	0.0520	0.0520		0.241	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Radium-226</b>	<b>0.302</b>		0.116	0.120	0.200	0.0495	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Radium-228</b>	<b>0.267</b>		0.129	0.132		0.0339	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thallium-208</b>	<b>0.109</b>		0.0769	0.0777		0.0341	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thorium-232</b>	<b>0.267</b>		0.129	0.132		0.0339	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Thorium-234	0.0688	U		0.211		0.963	pCi/g	11/02/20 17:57	11/26/20 11:09	1
<b>Thorium 228</b>	<b>0.254</b>		0.0906	0.0963		0.0568	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Uranium-235	-0.0198	U		0.620		0.433	pCi/g	11/02/20 17:57	11/26/20 11:09	1
Uranium-238	0.0688	U		0.211		0.963	pCi/g	11/02/20 17:57	11/26/20 11:09	1

**Client Sample ID: HPPG-317364365-SU28A-021**

**Lab Sample ID: 160-40091-21**

Date Collected: 10/21/20 16:14

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.00871	U	0.0623	0.0623	0.160	0.0505	pCi/g	11/06/20 11:01	11/26/20 10:44	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	87.7		40 - 110					11/06/20 11:01	11/26/20 10:44	1

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Plutonium-238	<b>0.00834</b>		0.0118	0.0118	0.100	0.00686	pCi/g	12/15/20 12:11	12/23/20 14:28	1
Plutonium-239/240	0.00209	U	0.0125	0.0125	0.100	0.00971	pCi/g	12/15/20 12:11	12/23/20 14:28	1
<b>Tracer</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Pu-242 (T)	100		30 - 110					12/15/20 12:11	12/23/20 14:28	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Uranium-234	0.445		0.0629	0.0732	0.250	0.00718	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-235/236	0.0109		0.0172	0.0172	0.100	0.0109	pCi/g	11/03/20 12:03	12/03/20 16:16	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-021**

**Lab Sample ID: 160-40091-21**

Date Collected: 10/21/20 16:14  
Date Received: 10/26/20 08:38

Matrix: Solid

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-238	0.494		0.0659	0.0779	0.250	0.00507	pCi/g	11/03/20 12:03	12/03/20 16:16	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Uranium-232	83.3		30 - 110					11/03/20 12:03	12/03/20 16:16	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.209	U	0.503	0.504		0.324	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Actinium 228</b>	<b>0.545</b>		0.144	0.154		0.0609	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Bismuth-212	-0.0750	U	0.767	0.767		0.626	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Bismuth-214</b>	<b>0.342</b>		0.122	0.127		0.0530	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Cesium-137	0.0273	U	0.0508	0.0508	0.0700	0.0388	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Lead-210	-0.787	U	1.71	1.71		1.43	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Lead-212</b>	<b>0.437</b>		0.0860	0.103		0.0364	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Lead-214</b>	<b>0.388</b>		0.104	0.111		0.0450	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Potassium-40</b>	<b>8.85</b>		1.34	1.62		0.284	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Protactinium-231	0.000	U	0.740	0.740		2.13	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Protactinium-234	-0.101	U	0.321	0.322		0.262	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Radium-226</b>	<b>0.342</b>		0.122	0.127	0.200	0.0530	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Radium-228</b>	<b>0.545</b>		0.144	0.154		0.0609	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Thallium-208	0.0591		0.0973	0.0975		0.0499	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Thorium-232</b>	<b>0.545</b>		0.144	0.154		0.0609	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Thorium-234</b>	<b>0.665</b>		0.632	0.636		0.432	pCi/g	11/02/20 17:57	11/26/20 11:11	1
<b>Thorium-228</b>	<b>0.437</b>		0.0860	0.103		0.0364	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Uranium-235	0.0909	U	0.202	0.203		0.472	pCi/g	11/02/20 17:57	11/26/20 11:11	1
Uranium-238	0.665		0.632	0.636		0.432	pCi/g	11/02/20 17:57	11/26/20 11:11	1

**Client Sample ID: HPPG-317364365-SU28A-022**

**Lab Sample ID: 160-40091-22**

Date Collected: 10/21/20 16:16  
Date Received: 10/26/20 08:38

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-227	0.213	U	0.440	0.440		0.354	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Actinium 228</b>	<b>0.447</b>		0.176	0.182		0.117	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Bismuth-212	-0.676	U	1.08	1.08		0.837	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Bismuth-214</b>	<b>0.382</b>		0.115	0.122		0.0419	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Cesium-137	0.0247	U	0.0554	0.0554	0.0700	0.0426	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Lead-210	-0.177	U	1.65	1.65		1.36	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Lead-212</b>	<b>0.295</b>		0.0967	0.104		0.0588	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Lead-214</b>	<b>0.491</b>		0.116	0.126		0.0518	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Potassium-40</b>	<b>7.03</b>		1.33	1.52		0.148	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Protactinium-231	0.000	U	0.715	0.715		2.23	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Protactinium-234	0.0949	U	0.253	0.253		0.204	pCi/g	11/04/20 17:38	11/25/20 17:58	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-022**

Date Collected: 10/21/20 16:16  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-22**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.382		0.115	0.122	0.200	0.0419	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Radium-228	0.447		0.176	0.182		0.117	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Thallium-208	0.159		0.0772	0.0789		0.0444	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Thorium-232	0.447		0.176	0.182		0.117	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Thorium-234	-0.883 U		0.872	0.878		1.10	pCi/g	11/04/20 17:38	11/25/20 17:58	1
<b>Thorium 228</b>	<b>0.295</b>		0.0967	0.104		0.0588	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Uranium-235	-0.195 U		0.464	0.464		0.467	pCi/g	11/04/20 17:38	11/25/20 17:58	1
Uranium-238	-0.883 U		0.872	0.878		1.10	pCi/g	11/04/20 17:38	11/25/20 17:58	1

**Client Sample ID: HPPG-317364365-SU28A-023**

Date Collected: 10/21/20 16:19  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-23**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	-0.0686 U		0.361	0.362		0.212	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Actinium 228</b>	<b>0.301</b>		0.110	0.114		0.0755	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Bismuth-212	-0.275 U		0.582	0.582		0.458	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Bismuth-214</b>	<b>0.221</b>		0.0745	0.0779		0.0353	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Cesium-137	0.00513 U		0.0350	0.0350	0.0700	0.0283	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Lead-210	0.443 U		0.966	0.967		0.772	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Lead-212	0.0317 U		0.0776	0.0777		0.0625	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Lead-214</b>	<b>0.223</b>		0.0674	0.0713		0.0671	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Potassium-40</b>	<b>7.13</b>		0.970	1.21		0.0769	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Protactinium-231	-0.588 U		1.81	1.81		1.47	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Protactinium-234	0.0848 U		0.143	0.143		0.139	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Radium-226</b>	<b>0.221</b>		0.0745	0.0779	0.200	0.0353	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Radium-228</b>	<b>0.301</b>		0.110	0.114		0.0755	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Thallium-208	0.112		0.0354	0.0373		0.00953	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Thorium-232	0.301		0.110	0.114		0.0755	pCi/g	11/03/20 18:38	12/01/20 21:50	1
<b>Thorium-234</b>	<b>0.281</b>		0.394	0.395		0.260	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Thorium 228	0.0317 U		0.0776	0.0777		0.0625	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Uranium-235	-0.0562 U		0.126	0.126		0.302	pCi/g	11/03/20 18:38	12/01/20 21:50	1
Uranium-238	0.281		0.394	0.395		0.260	pCi/g	11/03/20 18:38	12/01/20 21:50	1

**Client Sample ID: HPPG-317364365-SU28A-024**

Date Collected: 10/21/20 16:22  
Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-24**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.0596 U		0.392	0.392		0.327	pCi/g	11/03/20 18:38	12/01/20 21:52	1
<b>Actinium 228</b>	<b>0.220</b>		0.0910	0.0945		0.141	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Bismuth-212	0.414 U		0.961	0.962		0.758	pCi/g	11/03/20 18:38	12/01/20 21:52	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-317364365-SU28A-024**

Date Collected: 10/21/20 16:22  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-24**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.317		0.129	0.134		0.0554	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Cesium-137	0.0168	U	0.0442	0.0442	0.0700	0.0338	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Lead-210	-0.746	U	1.80	1.81		1.51	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Lead-212	0.276		0.117	0.121		0.0610	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Lead-214	0.245		0.117	0.120		0.0756	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Potassium-40	7.99		1.37	1.65		0.270	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Protactinium-231	0.747	U	1.90	1.91		2.09	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Protactinium-234	0.0473	U	0.104	0.104		0.263	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Radium-226	0.317		0.129	0.134	0.200	0.0554	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Radium-228	0.220		0.0910	0.0945		0.141	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Thallium-208	0.115		0.0939	0.0948		0.0440	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Thorium-232	0.220		0.0910	0.0945		0.141	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Thorium-234	0.583		0.514	0.519		0.402	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Thorium 228	0.276		0.117	0.121		0.0610	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Uranium-235	0.102	U	0.222	0.222		0.542	pCi/g	11/03/20 18:38	12/01/20 21:52	1
Uranium-238	0.583		0.514	0.519		0.402	pCi/g	11/03/20 18:38	12/01/20 21:52	1

**Client Sample ID: HPPG-317364365-SU28A-025**

Date Collected: 10/21/20 16:25  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-25**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.323	U	0.692	0.694		0.417	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Actinium 228	0.142	U	0.270	0.271		0.149	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Bismuth-212	0.0178	U	0.752	0.752		0.617	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Bismuth-214	0.400		0.131	0.137		0.0477	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Cesium-137	0.0000949	U	0.0622	0.0622	0.0700	0.0509	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Lead-210	-0.406	U	1.39	1.39		1.00	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Lead-212	0.406		0.0894	0.104		0.0367	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Lead-214	0.476		0.131	0.140		0.0809	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Potassium-40	7.07		1.42	1.60		0.264	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Protactinium-231	0.319	U	0.930	0.930		1.49	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Protactinium-234	0.0984	U	0.183	0.183		0.169	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Radium-226	0.400		0.131	0.137	0.200	0.0477	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Radium-228	0.142	U	0.270	0.271		0.149	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Thallium-208	0.120		0.0588	0.0601		0.0239	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Thorium-232	0.142	U	0.270	0.271		0.149	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Thorium-234	0.891		0.485	0.495		0.304	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Thorium 228	0.406		0.0894	0.104		0.0367	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Uranium-235	0.106	U	0.308	0.308		0.297	pCi/g	11/03/20 18:38	12/01/20 22:28	1
Uranium-238	0.891		0.485	0.495		0.304	pCi/g	11/03/20 18:38	12/01/20 22:28	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

**Client Sample ID: HPPG-F-015**

Date Collected: 10/21/20 15:22  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-26**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.114	U	0.432	0.432		0.252	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Actinium 228</b>	<b>0.536</b>		0.191	0.199		0.104	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Bismuth-212	0.000	U	0.363	0.363		0.540	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Bismuth-214</b>	<b>0.329</b>		0.108	0.113		0.0474	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Cesium-137	0.0124	U	0.0503	0.0503	0.0700	0.0269	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Lead-210	0.573	U	1.07	1.07		0.845	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Lead-212</b>	<b>0.460</b>		0.0772	0.0975		0.0301	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Lead-214</b>	<b>0.333</b>		0.0926	0.0988		0.0442	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Potassium-40</b>	<b>8.75</b>		1.17	1.47		0.0914	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Protactinium-231	0.000	U	0.398	0.398		1.85	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Protactinium-234	0.103	U	0.235	0.235		0.152	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Radium-226</b>	<b>0.329</b>		0.108	0.113	0.200	0.0474	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Radium-228</b>	<b>0.536</b>		0.191	0.199		0.104	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Thallium-208</b>	<b>0.161</b>		0.0514	0.0540		0.0160	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Thorium-232</b>	<b>0.536</b>		0.191	0.199		0.104	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Thorium-234	-0.347	U	0.989	0.989		0.806	pCi/g	11/03/20 18:38	12/01/20 22:29	1
<b>Thorium 228</b>	<b>0.460</b>		0.0772	0.0975		0.0301	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Uranium-235	-0.175	U	0.479	0.479		0.390	pCi/g	11/03/20 18:38	12/01/20 22:29	1
Uranium-238	-0.347	U	0.989	0.989		0.806	pCi/g	11/03/20 18:38	12/01/20 22:29	1

**Client Sample ID: HPPG-F-016**

Date Collected: 10/21/20 16:08  
 Date Received: 10/26/20 08:38

**Lab Sample ID: 160-40091-27**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.143	U	0.454	0.455		0.393	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Actinium 228</b>	<b>0.402</b>		0.168	0.174		0.191	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Bismuth-212	-0.0461	U	1.04	1.04		0.856	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Bismuth-214</b>	<b>0.443</b>		0.194	0.201		0.0788	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Cesium-137	0.0298	U	0.0617	0.0618	0.0700	0.0469	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Lead-210	-1.16	U	1.89	1.89		1.60	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Lead-212</b>	<b>0.334</b>		0.110	0.117		0.0664	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Lead-214</b>	<b>0.415</b>		0.172	0.179		0.113	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Potassium-40</b>	<b>8.54</b>		1.56	1.84		0.325	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Protactinium-231	-0.599	U	3.09	3.09		2.52	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Protactinium-234	0.112	U	0.300	0.301		0.250	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Radium-226</b>	<b>0.443</b>		0.194	0.201	0.200	0.0788	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Radium-228</b>	<b>0.402</b>		0.168	0.174		0.191	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Thallium-208</b>	<b>0.147</b>		0.0647	0.0669		0.0258	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Thorium-232</b>	<b>0.402</b>		0.168	0.174		0.191	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Thorium-234	0.919		0.773	0.781		0.545	pCi/g	11/03/20 18:38	12/01/20 23:02	1
<b>Thorium 228</b>	<b>0.334</b>		0.110	0.117		0.0664	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Uranium-235	0.155	U	0.595	0.595		0.485	pCi/g	11/03/20 18:38	12/01/20 23:02	1
Uranium-238	0.919		0.773	0.781		0.545	pCi/g	11/03/20 18:38	12/01/20 23:02	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Method: 905.0 - Total Beta Strontium (GFPC)

**Lab Sample ID:** MB 160-488460/24-A

**Matrix:** Solid

**Analysis Batch:** 490292

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 488460

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.01989	U	0.0586	0.0586	0.160	0.0499	pCi/g	11/06/20 11:01	11/26/20 10:48	1
<hr/>										
<b>Carrier</b>	<b>MB MB</b>							<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	%Yield	Qualifier	Limits					11/06/20 11:01	11/26/20 10:48	1
	86.4		40 - 110							

**Lab Sample ID:** LCS 160-488460/1-A

**Matrix:** Solid

**Analysis Batch:** 490302

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 488460

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Total Beta Strontium		7.77	6.487		0.537	0.160	0.0549	pCi/g	83	75 - 125
<hr/>										
<b>Carrier</b>	<b>LCS</b>	<b>LCS</b>								
Sr Carrier	%Yield	Qualifier	Limits							
	89.5		40 - 110							

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

**Lab Sample ID:** MB 160-487802/1-A

**Matrix:** Solid

**Analysis Batch:** 490870

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 487802

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Uranium-234	0.006585	U	0.0116	0.0116	0.250	0.00722	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-235/236	-0.002731	U	0.00546	0.00547	0.100	0.00635	pCi/g	11/03/20 12:03	12/03/20 16:16	1
Uranium-238	0.008762		0.00876	0.00879	0.250	0.00510	pCi/g	11/03/20 12:03	12/03/20 16:16	1
<hr/>										
<b>Tracer</b>	<b>MB MB</b>							<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Uranium-232	%Yield	Qualifier	Limits					11/03/20 12:03	12/03/20 16:16	1
	81.0		30 - 110							

**Lab Sample ID:** LCS 160-487802/2-A

**Matrix:** Solid

**Analysis Batch:** 490871

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 487802

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Uranium-234		3.18	2.913		0.293	0.250	0.0103	pCi/g	91	84 - 120
Uranium-238		3.26	3.199		0.317	0.250	0.00514	pCi/g	98	82 - 122
<hr/>										
<b>Tracer</b>	<b>LCS</b>	<b>LCS</b>								
Uranium-232	%Yield	Qualifier	Limits							
	75.9		30 - 110							

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

**Lab Sample ID:** MB 160-491927/1-A

**Matrix:** Solid

**Analysis Batch:** 493064

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 491927

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Plutonium-238	0.0000	U	0.0130	0.0130	0.100	0.0107	pCi/g	12/15/20 12:11	12/23/20 14:28	1
Plutonium-239/240	-0.01688	U	0.0124	0.0125	0.100	0.0138	pCi/g	12/15/20 12:11	12/23/20 14:28	1
<b>Tracer</b>	<b>MB</b>	<b>MB</b>								
Pu-242 (T)	%Yield	Qualifier	Limits							
	89.2		30 - 110							

**Lab Sample ID:** LCS 160-491927/2-A

**Matrix:** Solid

**Analysis Batch:** 493065

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 491927

Analyte	Spike Added	MB	MB	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qualifier								
Plutonium-238	2.61	2.475		0.251		0.100	0.00459	pCi/g	95	80 - 125	
Plutonium-239/2	2.64	2.610		0.262		0.100	0.00796	pCi/g	99	81 - 125	
40											
<b>Tracer</b>	<b>MB</b>	<b>MB</b>									
Pu-242 (T)	%Yield	Qualifier	Limits								
	88.4		30 - 110								

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-487736/1-A

**Matrix:** Solid

**Analysis Batch:** 490289

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 487736

Analyte	Result	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
		Result	Qualifier								
Actinium-227	-0.2720	U		0.534	0.535		0.305	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Actinium 228	0.06904			0.112	0.112		0.0508	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Bismuth-212	0.2256	U		0.391	0.391		0.281	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Bismuth-214	-0.01411	U		0.137	0.137		0.114	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Cesium-137	0.01799	U		0.0299	0.0300	0.0700	0.0211	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Lead-210	0.0000	U		0.266	0.266		0.821	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Lead-212	-0.06622	U		0.0814	0.0819		0.0926	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Lead-214	-0.01264	U		0.0648	0.0648		0.0539	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Potassium-40	-0.1927	U		0.684	0.685		0.430	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Protactinium-231	0.0000	U		0.422	0.422		1.34	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Protactinium-234	0.1019	U		0.0770	0.0777		0.135	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Radium-226	-0.01411	U		0.137	0.137	0.200	0.114	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Radium-228	0.06904			0.112	0.112		0.0508	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Thallium-208	-0.0008951	U		0.00144	0.00144		0.0283	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Thorium-232	0.06904			0.112	0.112		0.0508	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Thorium-234	0.1076	U		0.274	0.275		0.516	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Thorium 228	-0.06622	U		0.0814	0.0819		0.0926	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Uranium-235	-0.1276	U		0.343	0.343		0.277	pCi/g	11/02/20 15:15	11/26/20 12:47	1
Uranium-238	0.1076	U		0.274	0.275		0.516	pCi/g	11/02/20 15:15	11/26/20 12:47	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** LCS 160-487736/2-A  
**Matrix:** Solid  
**Analysis Batch:** 490283

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 487736

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		%Rec.	Limits
		Result	Qual		LOQ	DLC		
Americium-241	96.4	101.2		11.9		0.535	pCi/g	105 87 - 116
Cesium-137	26.8	29.82		3.13	0.0700	0.133	pCi/g	111 87 - 120
Cobalt-60	9.53	10.35		1.09		0.0507	pCi/g	109 87 - 115

**Lab Sample ID:** 160-40091-12 DU  
**Matrix:** Solid  
**Analysis Batch:** 490286

**Client Sample ID:** HPPG-317364365-SU28A-012  
**Prep Type:** Total/NA  
**Prep Batch:** 487736

Analyte	Sample Result	Sample Qual	DU		Uncert. (2σ+/-)	Total		RER	Limit
			Result	Qual		LOQ	DLC		
Actinium-227	0.0888	U	0.1457	U	0.442		0.334	pCi/g	0.06 1
Actinium 228	0.444		0.2050		0.121		0.159	pCi/g	0.90 1
Bismuth-212	-0.467	U	0.4631	U	0.943		0.738	pCi/g	0.56 1
Bismuth-214	0.235		0.4824		0.149		0.0550	pCi/g	1.02 1
Cesium-137	0.00289	U	-0.00757	U	0.0739	0.0700	0.0417	pCi/g	0.09 1
Lead-210	0.203	U	1.089		1.40		0.927	pCi/g	0.32 1
Lead-212	0.382		0.3730		0.111		0.0552	pCi/g	0.04 1
Lead-214	0.465		0.3193		0.129		0.0624	pCi/g	0.61 1
Potassium-40	8.34		9.310		1.77		0.333	pCi/g	0.30 1
Protactinium-231	0.000	U	0.7445	U	2.02		2.21	pCi/g	0.31 1
Protactinium-234	0.0807	U	-0.1073	U	0.336		0.273	pCi/g	0.31 1
Radium-226	0.235		0.4824		0.149	0.200	0.0550	pCi/g	1.02 1
Radium-228	0.444		0.2050		0.121		0.159	pCi/g	0.90 1
Thallium-208	0.228		0.1913		0.0600		0.0166	pCi/g	0.28 1
Thorium-232	0.444		0.2050		0.121		0.159	pCi/g	0.90 1
Thorium-234	-0.378	U	-0.3692	U	1.12		0.930	pCi/g	0 1
Thorium 228	0.382		0.3730		0.111		0.0552	pCi/g	0.04 1
Uranium-235	0.0891	U	0.0000	U	0.164		0.500	pCi/g	0.26 1
Uranium-238	-0.378	U	-0.3692	U	1.12		0.930	pCi/g	0 1

**Lab Sample ID:** MB 160-487748/1-A  
**Matrix:** Solid  
**Analysis Batch:** 490284

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 487748

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total		Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	LOQ	DLC	Unit	
Actinium-227	0.1241	U	0.178	0.178		0.205	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Actinium 228	0.04976	U	0.0934	0.0935		0.0883	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Bismuth-212	0.0000	U	0.245	0.245		0.188	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Bismuth-214	-0.04153	U	0.129	0.129		0.108	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Cesium-137	0.0000	U	0.00904	0.00904	0.0700	0.0192	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Lead-210	0.3548	U	0.673	0.674		0.514	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Lead-212	0.02518	U	0.0734	0.0734		0.0587	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Lead-214	0.003956	U	0.0202	0.0202		0.0598	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Potassium-40	0.2366		0.212	0.213		0.110	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Protactinium-231	0.0000	U	0.263	0.263		1.33	pCi/g	11/02/20 17:57 11/26/20 10:12 1
Protactinium-234	0.1210	U	0.191	0.191		0.130	pCi/g	11/02/20 17:57 11/26/20 10:12 1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-487748/1-A  
**Matrix:** Solid  
**Analysis Batch:** 490284

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 487748

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)	LOQ	Uncert.					
Radium-226	-0.04153	U		0.129	0.129	0.200	0.108	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Radium-228	0.04976	U		0.0934	0.0935		0.0883	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Thallium-208	-0.04052	U		0.0744	0.0745		0.0390	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Thorium-232	0.04976	U		0.0934	0.0935		0.0883	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Thorium-234	-0.2016	U		0.734	0.735		0.597	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Thorium 228	0.02518	U		0.0734	0.0734		0.0587	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Uranium-235	0.0000	U		0.126	0.126		0.237	pCi/g	11/02/20 17:57	11/26/20 10:12	1	
Uranium-238	-0.2016	U		0.734	0.735		0.597	pCi/g	11/02/20 17:57	11/26/20 10:12	1	

**Lab Sample ID:** LCS 160-487748/2-A  
**Matrix:** Solid  
**Analysis Batch:** 490338

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 487748

Analyte	Spike Added	LCS Result	LCS Qual	Total		DLC	Unit	%Rec	Limits
				Uncert. (2σ+/-)	LOQ				
Americium-241	96.4	97.61		11.4		0.503	pCi/g	101	87 - 116
Cesium-137	26.8	27.93		2.95	0.0700	0.106	pCi/g	104	87 - 120
Cobalt-60	9.52	9.537		1.02		0.0382	pCi/g	100	87 - 115

**Lab Sample ID:** MB 160-488132/1-A  
**Matrix:** Solid  
**Analysis Batch:** 490615

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 488132

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)	LOQ	Uncert.					
Actinium-227	0.009977	U		0.0270	0.0270		0.294	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Actinium 228	-0.007761	U		0.0124	0.0125		0.138	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Bismuth-212	0.2527	U		0.544	0.545		0.409	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Bismuth-214	-0.03229	U		0.160	0.160		0.133	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Cesium-137	-0.03466	U		0.0621	0.0622	0.0700	0.0473	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Lead-210	0.4648	U		1.28	1.28		0.898	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Lead-212	0.09539			0.0865	0.0873		0.0632	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Lead-214	-0.09745	U		0.0727	0.0734		0.0988	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Potassium-40	0.03303	U		0.830	0.830		0.491	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Protactinium-231	0.5484	U		1.57	1.57		1.72	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Protactinium-234	0.07113	U		0.178	0.178		0.106	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Radium-226	-0.03229	U		0.160	0.160	0.200	0.133	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Radium-228	-0.007761	U		0.0124	0.0125		0.138	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Thallium-208	-0.04653	U		0.0864	0.0865		0.0492	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Thorium-232	-0.007761	U		0.0124	0.0125		0.138	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Thorium-234	-0.4923	U		0.834	0.836		0.667	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Thorium 228	0.09539			0.0865	0.0873		0.0632	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Uranium-235	-0.02091	U		0.450	0.450		0.205	pCi/g	11/03/20 18:38	12/01/20 22:02	1	
Uranium-238	-0.4923	U		0.834	0.836		0.667	pCi/g	11/03/20 18:38	12/01/20 22:02	1	

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** LCS 160-488132/2-A  
**Matrix:** Solid  
**Analysis Batch:** 490612

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 488132

Analyte	Spike Added	LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec.	
		Result	Qual						Limits	
Americium-241	96.4	95.77		10.1		0.656	pCi/g	99	87 - 116	
Cesium-137	26.7	26.51		2.86	0.0700	0.114	pCi/g	99	87 - 120	
Cobalt-60	9.51	9.333		1.01		0.0186	pCi/g	98	87 - 115	

**Lab Sample ID:** 160-40091-23 DU  
**Matrix:** Solid  
**Analysis Batch:** 490652

**Client Sample ID:** HPPG-317364365-SU28A-023  
**Prep Type:** Total/NA  
**Prep Batch:** 488132

Analyte	Sample		DU		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	RER	
	Result	Qual	Result	Qual					RER	Limit
Actinium-227	-0.0686	U	0.04104	U	0.132		0.233	pCi/g	0.22	1
Actinium 228	0.301		0.1222		0.0905		0.0978	pCi/g	0.87	1
Bismuth-212	-0.275	U	0.01884	U	0.443		0.363	pCi/g	0.29	1
Bismuth-214	0.221		0.2102		0.0900		0.0403	pCi/g	0.06	1
Cesium-137	0.00513	U	0.003469	U	0.0469	0.0700	0.0384	pCi/g	0.02	1
Lead-210	0.443	U	-0.02737	U	0.892		0.733	pCi/g	0.25	1
Lead-212	0.0317	U	0.01696	U	0.0813		0.0660	pCi/g	0.09	1
Lead-214	0.223		0.3350		0.0835		0.0330	pCi/g	0.73	1
Potassium-40	7.13		6.955		1.24		0.226	pCi/g	0.07	1
Protactinium-231	-0.588	U	0.2395	U	0.948		1.49	pCi/g	0.30	1
Protactinium-234	0.0848	U	0.05747	U	0.165		0.134	pCi/g	0.09	1
Radium-226	0.221		0.2102		0.0900	0.200	0.0403	pCi/g	0.06	1
Radium-228	0.301		0.1222		0.0905		0.0978	pCi/g	0.87	1
Thallium-208	0.112		0.08678		0.0330		0.0105	pCi/g	0.37	1
Thorium-232	0.301		0.1222		0.0905		0.0978	pCi/g	0.87	1
Thorium-234	0.281		0.05146	U	0.0799		0.654	pCi/g	0.48	1
Thorium 228	0.0317	U	0.01696	U	0.0813		0.0660	pCi/g	0.09	1
Uranium-235	-0.0562	U	0.03824	U	0.174		0.256	pCi/g	0.31	1
Uranium-238	0.281		0.05146	U	0.0799		0.654	pCi/g	0.48	1

**Lab Sample ID:** MB 160-488229/1-A  
**Matrix:** Solid  
**Analysis Batch:** 490261

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 488229

Analyte	MB		Count Uncert. (2σ+/-)	Total		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier		Uncert. (2σ+/-)	Total Uncert. (2σ+/-)						
Actinium-227	0.009307	U	0.0193	0.0193		0.451	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Actinium 228	-0.03281	U	0.0424	0.0425		0.207	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Bismuth-212	0.0000	U	0.211	0.211		0.491	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Bismuth-214	-0.1961	U	0.130	0.131		0.299	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Cesium-137	-0.01941	U	0.0667	0.0667	0.0700	0.0572	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Lead-210	0.3158	U	1.03	1.03		0.730	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Lead-212	0.02194	U	0.124	0.124		0.100	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Lead-214	-0.02104	U	0.105	0.106		0.0884	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Potassium-40	-0.3910	U	1.27	1.27		0.629	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Protactinium-231	0.0000	U	0.266	0.266		2.38	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Protactinium-234	0.09066	U	0.244	0.244		0.115	pCi/g	11/04/20 17:38	11/25/20 17:48		1
Radium-226	-0.1961	U	0.130	0.131	0.200	0.299	pCi/g	11/04/20 17:38	11/25/20 17:48		1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
 SDG: GJ46599780

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-488229/1-A

**Matrix:** Solid

**Analysis Batch:** 490261

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 488229

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)					
Radium-228	-0.03281	U		0.0424		0.0425		0.207	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Thallium-208	0.06514			0.0492		0.0497		0.0280	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Thorium-232	-0.03281	U		0.0424		0.0425		0.207	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Thorium-234	-0.3284	U		0.611		0.612		0.523	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Thorium 228	0.02194	U		0.124		0.124		0.100	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Uranium-235	0.05125	U		0.114		0.114		0.231	pCi/g	11/04/20 17:38	11/25/20 17:48	1
Uranium-238	-0.3284	U		0.611		0.612		0.523	pCi/g	11/04/20 17:38	11/25/20 17:48	1

**Lab Sample ID:** LCS 160-488229/2-A

**Matrix:** Solid

**Analysis Batch:** 490255

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 488229

Analyte	Spike Added	LCS Result	LCS Qual	Total				%Rec	Limits
				Uncert. (2σ+/-)	LOQ	DLC	Unit		
Americium-241	96.4	101.1		10.6		0.453	pCi/g	105	87 - 116
Cesium-137	26.8	25.32		2.69	0.0700	0.0777	pCi/g	95	87 - 120
Cobalt-60	9.53	9.078		0.954		0.0437	pCi/g	95	87 - 115

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Rad**

**Leach Batch: 486980**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-1	HPPG-317364365-SU28A-001	Total/NA	Solid	Dry and Grind	
160-40091-2	HPPG-317364365-SU28A-002	Total/NA	Solid	Dry and Grind	
160-40091-3	HPPG-317364365-SU28A-003	Total/NA	Solid	Dry and Grind	
160-40091-4	HPPG-317364365-SU28A-004	Total/NA	Solid	Dry and Grind	
160-40091-5	HPPG-317364365-SU28A-005	Total/NA	Solid	Dry and Grind	
160-40091-6	HPPG-317364365-SU28A-006	Total/NA	Solid	Dry and Grind	
160-40091-7	HPPG-317364365-SU28A-007	Total/NA	Solid	Dry and Grind	
160-40091-8	HPPG-317364365-SU28A-008	Total/NA	Solid	Dry and Grind	
160-40091-9	HPPG-317364365-SU28A-009	Total/NA	Solid	Dry and Grind	
160-40091-10	HPPG-317364365-SU28A-010	Total/NA	Solid	Dry and Grind	
160-40091-11	HPPG-317364365-SU28A-011	Total/NA	Solid	Dry and Grind	
160-40091-12	HPPG-317364365-SU28A-012	Total/NA	Solid	Dry and Grind	
160-40091-13	HPPG-317364365-SU28A-013	Total/NA	Solid	Dry and Grind	
160-40091-14	HPPG-317364365-SU28A-014	Total/NA	Solid	Dry and Grind	
160-40091-15	HPPG-317364365-SU28A-015	Total/NA	Solid	Dry and Grind	
160-40091-16	HPPG-317364365-SU28A-016	Total/NA	Solid	Dry and Grind	
160-40091-17	HPPG-317364365-SU28A-017	Total/NA	Solid	Dry and Grind	
160-40091-18	HPPG-317364365-SU28A-018	Total/NA	Solid	Dry and Grind	
160-40091-19	HPPG-317364365-SU28A-019	Total/NA	Solid	Dry and Grind	
160-40091-20	HPPG-317364365-SU28A-020	Total/NA	Solid	Dry and Grind	
160-40091-21	HPPG-317364365-SU28A-021	Total/NA	Solid	Dry and Grind	
160-40091-12 DU	HPPG-317364365-SU28A-012	Total/NA	Solid	Dry and Grind	

**Leach Batch: 487040**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-22	HPPG-317364365-SU28A-022	Total/NA	Solid	Dry and Grind	
160-40091-23	HPPG-317364365-SU28A-023	Total/NA	Solid	Dry and Grind	
160-40091-24	HPPG-317364365-SU28A-024	Total/NA	Solid	Dry and Grind	
160-40091-25	HPPG-317364365-SU28A-025	Total/NA	Solid	Dry and Grind	
160-40091-26	HPPG-F-015	Total/NA	Solid	Dry and Grind	
160-40091-27	HPPG-F-016	Total/NA	Solid	Dry and Grind	
160-40091-23 DU	HPPG-317364365-SU28A-023	Total/NA	Solid	Dry and Grind	

**Prep Batch: 487736**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-1	HPPG-317364365-SU28A-001	Total/NA	Solid	Fill_Geo-21	486980
160-40091-2	HPPG-317364365-SU28A-002	Total/NA	Solid	Fill_Geo-21	486980
160-40091-3	HPPG-317364365-SU28A-003	Total/NA	Solid	Fill_Geo-21	486980
160-40091-4	HPPG-317364365-SU28A-004	Total/NA	Solid	Fill_Geo-21	486980
160-40091-5	HPPG-317364365-SU28A-005	Total/NA	Solid	Fill_Geo-21	486980
160-40091-6	HPPG-317364365-SU28A-006	Total/NA	Solid	Fill_Geo-21	486980
160-40091-7	HPPG-317364365-SU28A-007	Total/NA	Solid	Fill_Geo-21	486980
160-40091-8	HPPG-317364365-SU28A-008	Total/NA	Solid	Fill_Geo-21	486980
160-40091-9	HPPG-317364365-SU28A-009	Total/NA	Solid	Fill_Geo-21	486980
160-40091-10	HPPG-317364365-SU28A-010	Total/NA	Solid	Fill_Geo-21	486980
160-40091-11	HPPG-317364365-SU28A-011	Total/NA	Solid	Fill_Geo-21	486980
160-40091-12	HPPG-317364365-SU28A-012	Total/NA	Solid	Fill_Geo-21	486980
MB 160-487736/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-487736/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40091-12 DU	HPPG-317364365-SU28A-012	Total/NA	Solid	Fill_Geo-21	486980

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

**Rad**

**Prep Batch: 487748**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-13	HPPG-317364365-SU28A-013	Total/NA	Solid	Fill_Geo-21	486980
160-40091-14	HPPG-317364365-SU28A-014	Total/NA	Solid	Fill_Geo-21	486980
160-40091-15	HPPG-317364365-SU28A-015	Total/NA	Solid	Fill_Geo-21	486980
160-40091-16	HPPG-317364365-SU28A-016	Total/NA	Solid	Fill_Geo-21	486980
160-40091-17	HPPG-317364365-SU28A-017	Total/NA	Solid	Fill_Geo-21	486980
160-40091-18	HPPG-317364365-SU28A-018	Total/NA	Solid	Fill_Geo-21	486980
160-40091-19	HPPG-317364365-SU28A-019	Total/NA	Solid	Fill_Geo-21	486980
160-40091-20	HPPG-317364365-SU28A-020	Total/NA	Solid	Fill_Geo-21	486980
160-40091-21	HPPG-317364365-SU28A-021	Total/NA	Solid	Fill_Geo-21	486980
MB 160-487748/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-487748/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

**Prep Batch: 487802**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-1	HPPG-317364365-SU28A-001	Total/NA	Solid	ExtChrom	486980
160-40091-11	HPPG-317364365-SU28A-011	Total/NA	Solid	ExtChrom	486980
160-40091-21	HPPG-317364365-SU28A-021	Total/NA	Solid	ExtChrom	486980
MB 160-487802/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-487802/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

**Prep Batch: 488132**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-23	HPPG-317364365-SU28A-023	Total/NA	Solid	Fill_Geo-21	487040
160-40091-24	HPPG-317364365-SU28A-024	Total/NA	Solid	Fill_Geo-21	487040
160-40091-25	HPPG-317364365-SU28A-025	Total/NA	Solid	Fill_Geo-21	487040
160-40091-26	HPPG-F-015	Total/NA	Solid	Fill_Geo-21	487040
160-40091-27	HPPG-F-016	Total/NA	Solid	Fill_Geo-21	487040
MB 160-488132/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488132/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40091-23 DU	HPPG-317364365-SU28A-023	Total/NA	Solid	Fill_Geo-21	487040

**Prep Batch: 488229**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-22	HPPG-317364365-SU28A-022	Total/NA	Solid	Fill_Geo-21	487040
MB 160-488229/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488229/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

**Prep Batch: 488460**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-1	HPPG-317364365-SU28A-001	Total/NA	Solid	DPS-0	486980
160-40091-11	HPPG-317364365-SU28A-011	Total/NA	Solid	DPS-0	486980
160-40091-21	HPPG-317364365-SU28A-021	Total/NA	Solid	DPS-0	486980
MB 160-488460/24-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-488460/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

**Prep Batch: 491927**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40091-1	HPPG-317364365-SU28A-001	Total/NA	Solid	ExtChrom	486980
160-40091-11	HPPG-317364365-SU28A-011	Total/NA	Solid	ExtChrom	486980
160-40091-21	HPPG-317364365-SU28A-021	Total/NA	Solid	ExtChrom	486980
MB 160-491927/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Rad (Continued)

### Prep Batch: 491927 (Continued)

Lab Sample ID LCS 160-491927/2-A	Client Sample ID Lab Control Sample	Prep Type Total/NA	Matrix Solid	Method ExtChrom	Prep Batch

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40091-1  
SDG: GJ46599780

## Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-40091-1	HPPG-317364365-SU28A-001	82.7	
160-40091-11	HPPG-317364365-SU28A-011	90.2	
160-40091-21	HPPG-317364365-SU28A-021	87.7	
LCS 160-488460/1-A	Lab Control Sample	89.5	
MB 160-488460/24-A	Method Blank	86.4	

**Tracer/Carrier Legend**  
Sr = Sr Carrier

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Pu-242 (T)	(30-110)
160-40091-1	HPPG-317364365-SU28A-001	92.6	
160-40091-11	HPPG-317364365-SU28A-011	93.2	
160-40091-21	HPPG-317364365-SU28A-021	100	
LCS 160-491927/2-A	Lab Control Sample	88.4	
MB 160-491927/1-A	Method Blank	89.2	

**Tracer/Carrier Legend**  
Pu-242 (T) = Pu-242 (T)

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232	(30-110)
160-40091-1	HPPG-317364365-SU28A-001	82.0	
160-40091-11	HPPG-317364365-SU28A-011	77.1	
160-40091-21	HPPG-317364365-SU28A-021	83.3	
LCS 160-487802/2-A	Lab Control Sample	75.9	
MB 160-487802/1-A	Method Blank	81.0	

**Tracer/Carrier Legend**  
U-232 = Uranium-232

Eurofins TestAmerica, St. Louis



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-40097-1  
Laboratory Sample Delivery Group: D1189472  
Client Project/Site: HPNS-Parcel G 501197  
Revision: 1

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
4/12/2021 4:44:00 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Chain of Custody . . . . .	6
Receipt Checklists . . . . .	8
Definitions/Glossary . . . . .	9
Method Summary . . . . .	10
Sample Summary . . . . .	11
Client Sample Results . . . . .	12
QC Sample Results . . . . .	13
QC Association Summary . . . . .	16
Tracer Carrier Summary . . . . .	17

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

**Job ID: 160-40097-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

Narrative

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-40097-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Additional information requested in case narrative for total strontium

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

## Job ID: 160-40097-1 (Continued)

### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

#### RECEIPT

The samples were received on 10/26/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 16.3 C.

#### TOTAL BETA STRONTIUM (GFPC)

Sample HPPG-317364365-SU28A-B-001 (160-40097-1) was analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/28/2020, prepared on 11/25/2020 and analyzed on 12/11/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP:HPPG-317364365-SU28A-B-001 (160-40097-1).

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Sample HPPG-317364365-SU28A-B-001 (160-40097-1) was analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 10/28/2020, prepared on 11/10/2020 and analyzed on 12/07/2020.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-488774/1-A)

Manual Integrations and adjustments to Regions of Interest (ROI) were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.HPPG-317364365-SU28A-B-001 (160-40097-1), (LCS 160-488774/2-A), (MB 160-488774/1-A), (160-40094-A-1-E) and (160-40094-A-1-K DU)

During analysis the pulser (used for the daily checks) was left on inadvertently which caused the scaling to be greater than normal. Manual integration was performed in order to "zoom in" to the correct scaling for the samples. Both, the original and the "zoomed in" spectra PDF's, are included in the deliverable. HPPG-317364365-SU28A-B-001 (160-40097-1), (LCS 160-488774/2-A), (MB 160-488774/1-A), (160-40094-A-1-E) and (160-40094-A-1-K DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ISOTOPIC URANIUM (ALPHA SPECTROMETRY)

Sample HPPG-317364365-SU28A-B-001 (160-40097-1) was analyzed for Isotopic Uranium (Alpha Spectrometry) in accordance with DOE. The samples were dried on 10/28/2020, prepared on 11/10/2020 and analyzed on 12/07/2020.

Manual Integrations and adjustments to Regions of Interest (ROI) were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report. HPPG-317364365-SU28A-B-001 (160-40097-1), (LCS 160-488775/2-A), (MB 160-488775/1-A), (160-40094-A-1-G) and (160-40094-A-1-J DU)

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-488775/1-A)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample HPPG-317364365-SU28A-B-001 (160-40097-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 10/28/2020, prepared on 11/04/2020 and analyzed on 12/02/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

### Job ID: 160-40097-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Inferred from    Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The method blank (MB) z-score associated with Prep Batch 160-488209 is within limits and is stored in the level IV raw data. (MB 160-488209/1-A)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.  
HPPG-317364365-SU28A-B-001 (160-40097-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-015

Page 1 of 2

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Barcik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez

Project Number: 501197				Analysis Requested									
Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action				Strontium-89 (EPA 905 M02)	U	Isotope Pu (238, 239240)	Dose Rate uR/Hr	Evidence Bag ID		Comment			
Project Location: San Francisco, CA				day in Growth Curve	(24, 2556, 238)	Ra-226 by Alpha spec, Isotopic U							
Purchase Order #: 1159058				Centrifuge Spec (EPA 901, 1M) - Full 21									
Shipment/Pickup Date: 10/23/2020													
Waybill Number: 2175702254373													
Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046													
Lab Contact Name/ph #				Rhoeda Ridenbower (314)298-8566									
Sample ID	Date	Time	Method	# of Containers	Matrix	Preservatives (water)	Preservatives (soil)						
HPPG-317364365-SU28A-B-001	10/22/2020	09:18	G	SO	1	16 oz. plastic jar		X	X	X	X	4	
D1189472													

## Special Instructions:

21 day ingrowth results only  
Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/gTuranaaround Time: 3-day  10-Day  28-day  Other  Level of QC Required: I II III Project Specific

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Locked Storage (RKillpack)		10/23/2020 17:13	Devin Lewis		10/23/2020 17:13
Devin Lewis		10/23/2020 17:26	SHIPPED TOLAB		10/23/2020 08:38
Devin Lewis		10/23/2020 17:26	SHIPPED TOLAB		10/23/2020 08:38

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*

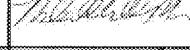
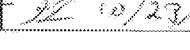


160-40097 Chain of Custody



# All Transfers for COC 501197RSY-015

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/22/2020 17:43	Locked Storage (RKillpack)		10/22/2020 17:43
Locked Storage (RKillpack)		10/23/2020 17:13	Devin Lewis		10/23/2020 17:13
Devin Lewis		10/23/2020 17:26	SHIPPEDTOLAB		10/26/2020 08:36
Devin Lewis		10/23/2020 17:26	SHIPPEDTOLAB		10/23/2020



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-40097-1

SDG Number: D1189472

**Login Number: 40097**

**List Source: Eurofins TestAmerica, St. Louis**

**List Number: 1**

**Creator: Korrinhizer, Micha L**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Uranium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

## Protocol References:

DOE = U.S. Department of Energy

None = None

## Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

## Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40097-1	HPPG-317364365-SU28A-B-001	Solid	10/22/20 09:18	10/26/20 08:38	

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
 SDG: D1189472

**Client Sample ID: HPPG-317364365-SU28A-B-001**

**Lab Sample ID: 160-40097-1**

Date Collected: 10/22/20 09:18

Matrix: Solid

Date Received: 10/26/20 08:38

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0477		0.0470	0.0471	0.160	0.0341	pCi/g	11/25/20 14:30	12/11/20 07:04	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	108		40 - 110					11/25/20 14:30	12/11/20 07:04	1

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-238	-0.00576	U	0.0158	0.0158	0.100	0.0141	pCi/g	11/10/20 16:55	12/07/20 15:19	1
Plutonium-239/240	0.00576		0.00665	0.00667	0.100	0.00447	pCi/g	11/10/20 16:55	12/07/20 15:19	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242 (T)	93.0		30 - 110					11/10/20 16:55	12/07/20 15:19	1

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-234	0.369		0.0590	0.0666	0.250	0.00755	pCi/g	11/10/20 17:08	12/07/20 15:14	1
Uranium-235/236	0.0314		0.0189	0.0191	0.100	0.00664	pCi/g	11/10/20 17:08	12/07/20 15:14	1
Uranium-238	0.369		0.0588	0.0665	0.250	0.00754	pCi/g	11/10/20 17:08	12/07/20 15:14	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Uranium-232	76.2		30 - 110					11/10/20 17:08	12/07/20 15:14	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.427		0.161	0.167	0.189	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Actinium-227	0.163	U	0.418	0.419	0.337	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Bismuth-212	-0.0166	U	1.18	1.18	0.968	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Bismuth-214	0.553		0.150	0.160	0.0516	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Cesium-137	-0.0337	U	0.0874	0.0874	0.0700	0.0846	pCi/g	11/04/20 13:46	12/02/20 13:54	1
Lead-210	-0.720	U	1.83	1.84	1.54	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Lead-212	0.388		0.101	0.109	0.0552	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Lead-214	0.550		0.129	0.140	0.0630	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Potassium-40	8.22		1.45	1.67	0.292	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Protactinium-231	0.000	U	1.01	1.01	2.55	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Protactinium-234	0.0768	U	0.233	0.233	0.268	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Radium-226	0.553		0.150	0.160	0.0516	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Radium-228	0.427		0.161	0.167	0.189	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Thallium-208	0.205		0.0667	0.0699	0.0224	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Thorium 228	0.388		0.101	0.109	0.0552	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Thorium-232	0.427		0.161	0.167	0.189	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Thorium-234	-0.421	U	1.05	1.05	0.879	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Uranium-235	-0.255	U	0.656	0.657	0.607	pCi/g	11/04/20 13:46	12/02/20 13:54	1	
Uranium-238	-0.421	U	1.05	1.05	0.879	pCi/g	11/04/20 13:46	12/02/20 13:54	1	

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

## Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-490265/23-A

Matrix: Solid

Analysis Batch: 491588

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 490265

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.02016	U	0.0539	0.0539	0.160	0.0460	pCi/g	11/25/20 14:30	12/11/20 07:07	1
<hr/>										
Carrier	MB MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Sr Carrier		96.3		40 - 110				11/25/20 14:30	12/11/20 07:07	1

Lab Sample ID: LCS 160-490265/1-A

Matrix: Solid

Analysis Batch: 491444

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 490265

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Total Beta Strontium		7.76	6.013		0.491	0.160	0.0470	pCi/g	77	75 - 125
<hr/>										
Carrier	LCS	LCS	%Yield	Qualifier	Limits					
Sr Carrier		109			40 - 110					

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Lab Sample ID: MB 160-488775/1-A

Matrix: Solid

Analysis Batch: 491105

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 488775

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Uranium-234	0.0000	U	0.0152	0.0152	0.250	0.0125	pCi/g	11/10/20 17:08	12/07/20 15:14	1
Uranium-235/236	0.002733	U	0.00947	0.00947	0.100	0.00636	pCi/g	11/10/20 17:08	12/07/20 15:14	1
Uranium-238	-0.002192	U	0.0181	0.0181	0.250	0.0153	pCi/g	11/10/20 17:08	12/07/20 15:14	1
<hr/>										
Tracer	MB MB	%Yield	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Uranium-232		81.2		30 - 110				11/10/20 17:08	12/07/20 15:14	1

Lab Sample ID: LCS 160-488775/2-A

Matrix: Solid

Analysis Batch: 491106

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 488775

Analyte	Spike		LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Uranium-234		3.18	3.300		0.328	0.250	0.0121	pCi/g	104	84 - 120
Uranium-238		3.26	3.432		0.339	0.250	0.00541	pCi/g	105	82 - 122
<hr/>										
Tracer	LCS	LCS	%Yield	Qualifier	Limits					
Uranium-232		78.7			30 - 110					

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
 SDG: D1189472

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

**Lab Sample ID:** MB 160-488774/1-A

**Matrix:** Solid

**Analysis Batch:** 491103

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 488774

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Plutonium-238	0.005594	U		0.0194	0.0194	0.100	pCi/g	11/10/20 16:55	12/07/20 15:19	1
Plutonium-239/240	0.003733	U		0.00747	0.00747	0.100	pCi/g	11/10/20 16:55	12/07/20 15:19	1
<b>Tracer</b>		<b>MB</b>	<b>MB</b>							
Pu-242 (T)	92.5	%Yield	Qualifier	Limits						
		30 - 110								

**Lab Sample ID:** LCS 160-488774/2-A

**Matrix:** Solid

**Analysis Batch:** 491099

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 488774

Analyte	Spike Added	LCS Result	LCS Qual	Count	Total	DLC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)	Uncert. (2σ+/-)				
Plutonium-238	2.61	2.527		0.255	0.100	0.0205	pCi/g	97	80 - 125
Plutonium-239/2	2.64	2.457		0.248	0.100	0.00633	pCi/g	93	81 - 125
40									
<b>Tracer</b>		<b>LCS</b>	<b>LCS</b>						
Pu-242 (T)	97.3	%Yield	Qualifier	Limits					
		30 - 110							

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-488209/1-A

**Matrix:** Solid

**Analysis Batch:** 490647

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 488209

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac	
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.02805	U		0.199	0.199	0.106	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Actinium-227	0.01440	U		0.451	0.451	0.280	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Bismuth-212	0.0000	U		0.189	0.189	0.383	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Bismuth-214	0.01315	U		0.147	0.147	0.119	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Cesium-137	-0.02984	U		0.0378	0.0379	0.0700	0.0533	pCi/g	11/04/20 13:46	12/02/20 13:51	1
Lead-210	1.586			1.34	1.36	0.890	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Lead-212	0.009318	U		0.101	0.101	0.0824	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Lead-214	0.01598	U		0.107	0.107	0.0856	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Potassium-40	-0.1967	U		0.997	0.997	0.304	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Protactinium-231	0.0000	U		0.158	0.158	1.98	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Protactinium-234	0.01447	U		0.0320	0.0320	0.216	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Radium-226	0.01315	U		0.147	0.147	0.200	0.119	pCi/g	11/04/20 13:46	12/02/20 13:51	1
Radium-228	0.02805	U		0.199	0.199	0.106	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Thallium-208	-0.004688	U		0.00594	0.00596	0.0547	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Thorium 228	0.009318	U		0.101	0.101	0.0824	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Thorium-232	0.02805	U		0.199	0.199	0.106	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Thorium-234	-0.5789	U		0.465	0.470	0.422	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Uranium-235	0.06692	U		0.212	0.212	0.348	pCi/g	11/04/20 13:46	12/02/20 13:51	1	
Uranium-238	-0.5789	U		0.465	0.470	0.422	pCi/g	11/04/20 13:46	12/02/20 13:51	1	

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-488209/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 490648

Prep Batch: 488209

Analyte	Spike Added	LCS		Total		DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)	LOQ				
Americium-241	96.4	98.24		10.3		0.585	pCi/g	102	87 - 116
Cesium-137	26.7	26.94		2.91	0.0700	0.128	pCi/g	101	87 - 120
Cobalt-60	9.50	9.522		1.03		0.0428	pCi/g	100	87 - 115

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

Rad

Leach Batch: 487040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40097-1	HPPG-317364365-SU28A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 488209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40097-1	HPPG-317364365-SU28A-B-001	Total/NA	Solid	Fill_Geo-21	487040
MB 160-488209/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488209/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 488774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40097-1	HPPG-317364365-SU28A-B-001	Total/NA	Solid	ExtChrom	487040
MB 160-488774/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-488774/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 488775

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40097-1	HPPG-317364365-SU28A-B-001	Total/NA	Solid	ExtChrom	487040
MB 160-488775/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-488775/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 490265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40097-1	HPPG-317364365-SU28A-B-001	Total/NA	Solid	DPS-0	487040
MB 160-490265/23-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-490265/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

Eurofins TestAmerica, St. Louis

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40097-1  
SDG: D1189472

## Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-40097-1	HPPG-317364365-SU28A-B-00	108	
LCS 160-490265/1-A	Lab Control Sample	109	
MB 160-490265/23-A	Method Blank	96.3	

**Tracer/Carrier Legend**  
Sr = Sr Carrier

## Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Pu-242 (T)	(30-110)
160-40097-1	HPPG-317364365-SU28A-B-00	93.0	
LCS 160-488774/2-A	Lab Control Sample	97.3	
MB 160-488774/1-A	Method Blank	92.5	

**Tracer/Carrier Legend**  
Pu-242 (T) = Pu-242 (T)

## Method: A-01-R - Isotopic Uranium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		U-232	(30-110)
160-40097-1	HPPG-317364365-SU28A-B-00	76.2	
LCS 160-488775/2-A	Lab Control Sample	78.7	
MB 160-488775/1-A	Method Blank	81.2	

**Tracer/Carrier Legend**  
U-232 = Uranium-232

Eurofins TestAmerica, St. Louis